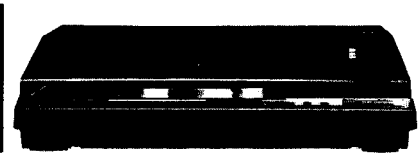
PIONEER

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS



ORDER NO.
ARP-684-0

STEREO TURNTABLE

PL-L70

MODEL PL-L70 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	AC120V only	U.S.A. model
KC	AC120V only	Canada model
HEM	AC220V, 240V (Switchable)	European continent model
HB	AC220V, 240V (switchable)	United Kingdom model
S	AC110V, 120V, 220V, 240V, (switchable)	General export model
S/G	AC110V, 120V, 220V, 240V (switchable)	U.S. Military model

- **This service manual is applicable to the KU, KC, HEM, HB, S and S/G types.**
- **As to the KC, HEM, HB, S and S/G types, please refer to pages 72 and 73.**
- **Ce manual d'instruction se refére au mode de réglage, en français.**
- **Este manual de servicio trata del método de ajuste escrito en español.**

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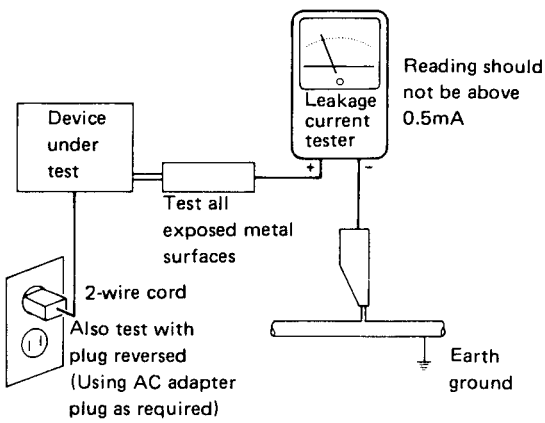
1. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. SPECIFICATIONS

Motor and Turntable

Drive System ..... Direct-drive
Motor ..... Quartz PLL Hall motor
Turntable Platter .....304 mm diam. aluminum alloy die-cast
Speeds ..... 33-1/3 and 45 rpm
Wow and Flutter ..... Less than *0.012% (WRMS)
0.025% (WRMS)
±0.035% WTD Peak (DIN)
Values marked with an "*" designate the wow and flutter for the motor, and do not include the cartridge or tonearm load.
Signal-to-Noise-Ratio ..... More than 80 dB (DIN-B)
(with Pioneer cartridge model PC-301)

Motor characteristics
Start up ..... Less than 1/3 revolution
Speed variation ..... Less than 0.002%
Drift ..... Time: 0.0003%/h
Temp: 0.003%/°C

Tonearm

Type ..... Integrated straight tonearm

PC-301 Specifications

Type ..... IM type
Stylus ..... 0.3 x 0.7 mil diamond (PN-301)
Output Voltage ..... 2.5 mV
(1 kHz, 5 cm/s LAT. Peak)
Tracking Force ..... 1 g to 1.5 g (proper 1.25 g)
Frequency Response ..... 10 to 33,000 Hz
Recommended Load ..... 50 kΩ
Weight ..... 4 g

Subfunctions

Auto lead-in, auto return, auto cut, repeat, arm elevation, program search play, manual play, skip, auto disc size selector, record detection, auto speed selector

Miscellaneous

Power Requirements
HEM, HB, HP models .....AC 220 V/240 V~ (switchable), 50, 60 Hz
KU, KC models ..... AC 120 V, 60 Hz
S, S/G models .....AC 110V/120 V/220 V/240 V~ (switchable), 50, 60 Hz

Power Consumption
HEM, HB, HP models ..... 15 W
KU, KC models ..... 14 W
S, S/G models ..... 10 W
Dimensions ..... 420 (W) x 108 (H) x 365 (D) mm
16-1/2 (W) x 4-1/4 (H) x 14-3/8 (D) in.
Weight ..... 5 kg/11 lb

Accessories

EP Adapter 1
Operating Instructions 1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

INFORMATION TO USER [FOR U.S.A. MODEL]

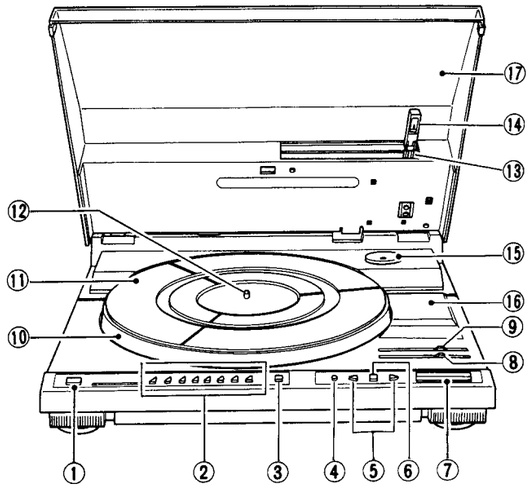
This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacture's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- reorient the receiving antenna
- relocate this component with respect to the receiver
- move this component away from the receiver
- plug this component into a different outlet so that component and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Comission helpful:
"How to Identify and Resolve Radio-TV Interference Problems".
This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4.

The above instructions apply only to units which will be operated in the United States.

3. FRONT PANEL FACITIES



① POWER switch

Press this switch to turn the power on and off.
[ON] (depressed position) : Power is switched ON.
[STAND-BY] (released position): Power is switched OFF.

② PROGRAM switches/indicator

- Press these switches in the desired sequence from [1] through [8] when programming the order in which the tracks are to be played. The tracks are programmed in the order in which the switches were pressed, and auto play or repeat play is performed.
- The numbers [1] through [8] indicate the order of the tracks on the record (for instance, the [2] switch corresponds with the second track). During programmed playback, the program indicator corresponding to the track presently being played will flash.

③ CLEAR switch

This switch is pressed in order to clear the program.

④ REPEAT switch/indicator

Press this switch so that the indicator lights for repeat play.

⑤ LOCATE/SKIP switches (SKIP)

Use these switches to start manual playback, or during playback to change the track being played. When the switches are pressed, the tonearm will move to the right or left.
[◄◄]: Tonearm moves to left. During programmed play, moves to the next programmed track. If pressed multiple times, moves ahead the number of tracks corresponding to the number of times the switch is pressed.
[►►]: Tonearm moves to right. During programmed play, moves back to the beginning of the track presently being played. If pressed multiple times, moves back the number of tracks corresponding to the number of times the switch is pressed.

NOTE:
When this switch is used during programmed play, do not allow more than a 1-second interval between presses.

⑥ ARM ELEVATION switch(UP)/ indicator

- Use the switch for manual play.
- Use the switch to suspend record play temporarily.
- Use the switch when changing the tracks during manual play.

[UP] indicator lights:
The tonearm rises (the stylus moves away from the record).
[UP] indicator goes out:
The tonearm descends (the stylus is lowered onto the record).

⑦ START/STOP switch

Depress this switch when starting auto play or when stopping play.

⑧ SPEED switch

Set this switch in accordance with the speed of the record which is to be played.
[AUTO]: Automatically sets rotation speed in accordance with the size of the record: Rotates at 33-1/3 rpm with 30 cm and 25 cm records. Rotates at 45 rpm with 17 cm records.
[33]: Rotates at 33-1/3 rpm
[45]: Rotates at 45 rpm

⑨ SENSOR switch

Depending on the type of record being played, this switch may be used to adjust the sensitivity at the time of programmed play.

Normally the switch should be left in [N] position.

[N]: For normal records.
[H]: For records with very narrow intervals between tracks.
[L]: For records with wide sound-groove pitch.

⑩ Platter

⑪ Rubber mat

⑫ Platter shaft

⑬ Tonearm

⑭ Cartridge (PC-301)

⑮ EP adapter

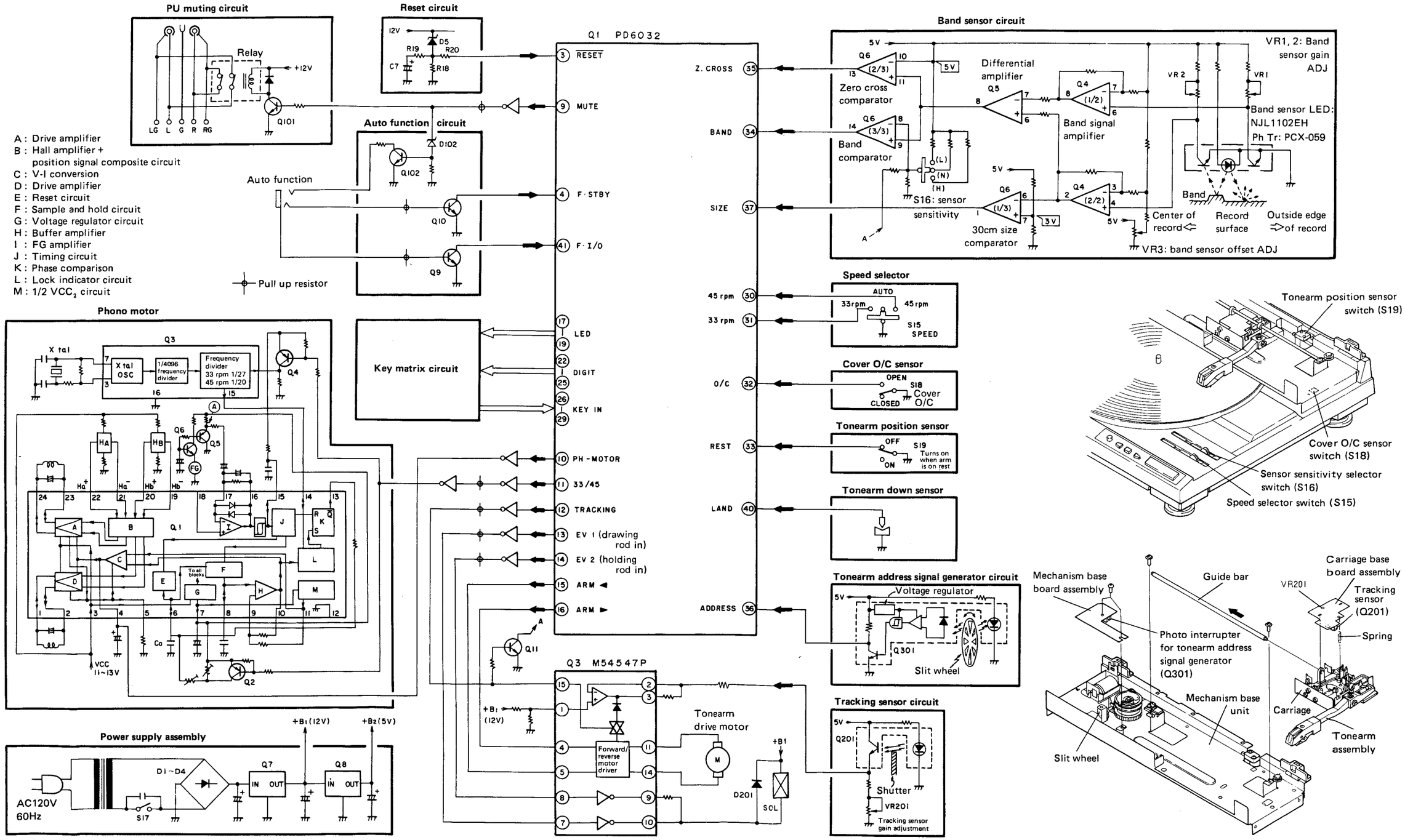
This is used when playing records with a "large center hole".

⑯ Cabinet

⑰ Dust cover

4. BLOCK DIAGRAM

A : Drive amplifier
B : Hall amplifier + position signal composite circuit
C : V-I conversion
D : Drive amplifier
E : Reset circuit
F : Sample and hold circuit
G : Voltage regulator circuit
H : Buffer amplifier
I : FG amplifier
J : Timing circuit
K : Phase comparison
L : Lock indicator circuit
M : 1/2 VCC_2 circuit



Tonearm position sensor switch (S19)
Cover O/C sensor switch (S18)
Sensor sensitivity selector switch (S16)
Speed selector switch (S15)

5. CIRCUIT DESCRIPTIONS

5.1 CIRCUIT DESCRIPTIONS

5.1.1 Address Sensor Circuit

The address sensor is located on the mechanism base unit. It detects the position of the tonearm and sends address pulses to the control IC as the tonearm moves. The address sensor is made up of an internal Schmitt trigger circuit photo interrupter and a slit wheel which is synchronized with the carriage. The slit wheel spins when the carriage moves and intermittently cuts off light to the photo interrupter (Q301) in pulses which correspond to the carriage movement. These pulses are counted by the control IC, which detects the distance the carriage moves, the tonearm lowering position and the end of the record. It also registers band addresses.

The address pulses from the photo interrupter work as follows: When the light is cut off, the output is "L," and when the light is not cut off the output is "H." One address signal pulse is approximately equivalent to 0.114 mm of tonearm movement.

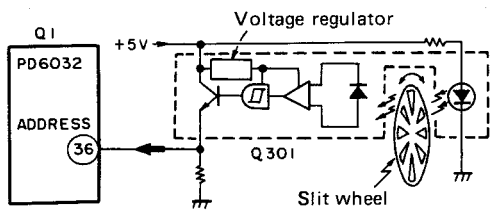


Fig. 5-1 Address Sensor Circuit

5.1.2 Tracking Sensor Circuit

This circuit detects tracking errors by means of a shutter which is synchronized with the tonearm and a photo interrupter.

The tracking sensor is made up of a shutter synchronized with the tonearm and a photo interrupter which is mounted onto the carriage base board. When the tonearm lowers and begins tracing the record surface the tonearm tracking errors increase as the number of rpms increases. When tracking errors increase, the shutter, which is synchronized with the tonearm, also moves and the light cut-off rate of the photo interrupter changes. Subsequently, the output of the photo interrupter changes and is sent to the tonearm drive unit in the form of tracking error signals.

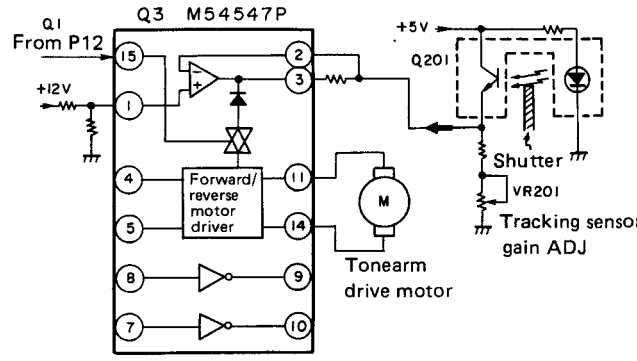


Fig. 5-2 Tracking sensor circuit

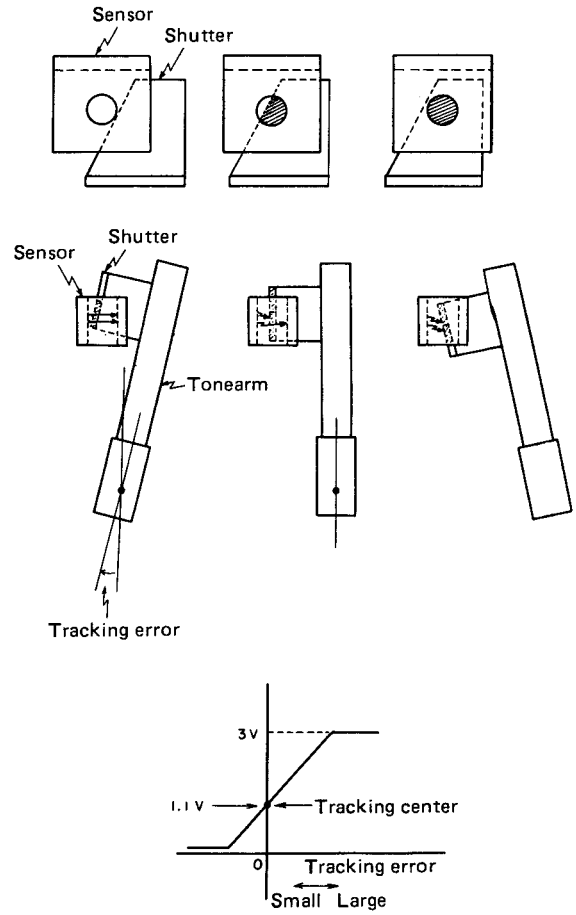


Fig. 5-3 Detection of tracking errors.

5.1.3 Band Sensor Circuit

The band sensor circuit detects the size of the record and width of bands by means of a band sensor. It is made up of a 30cm size comparator, a band comparator, a zero cross comparator, a differential amplifier circuit, an amplifier, and a band sensor.

The band sensor itself is made up of 2 phototransistors (PCX-059) mounted into the headshell of the tonearm and an infrared LED (NJL1102EH). It uses a light sensor and the different rates of light reflection to determine the difference between a sound groove and a plain band. The output of the band sensor is amplified by each of the amplifiers and applied to the differential amplifier to obtain a waveform like that of C in figure 5-5. The zero cross comparator detects a band signal (zero cross point), from the differential amplifier and the band comparator detects signals whose potential is less than Q6 (3/3) pin 8 as a band signal.

These signals then enter the control IC (PD6032) in the waveforms shown in D and E in figure 5-5. In this way, the center of the band that the tonearm is tracing can be detected.

The 30cm size comparator receives the amplified output signal of the band sensor. If it detects no record in the 30cm area, then a waveform as shown in F in figure 5-5 will be output to the control IC.

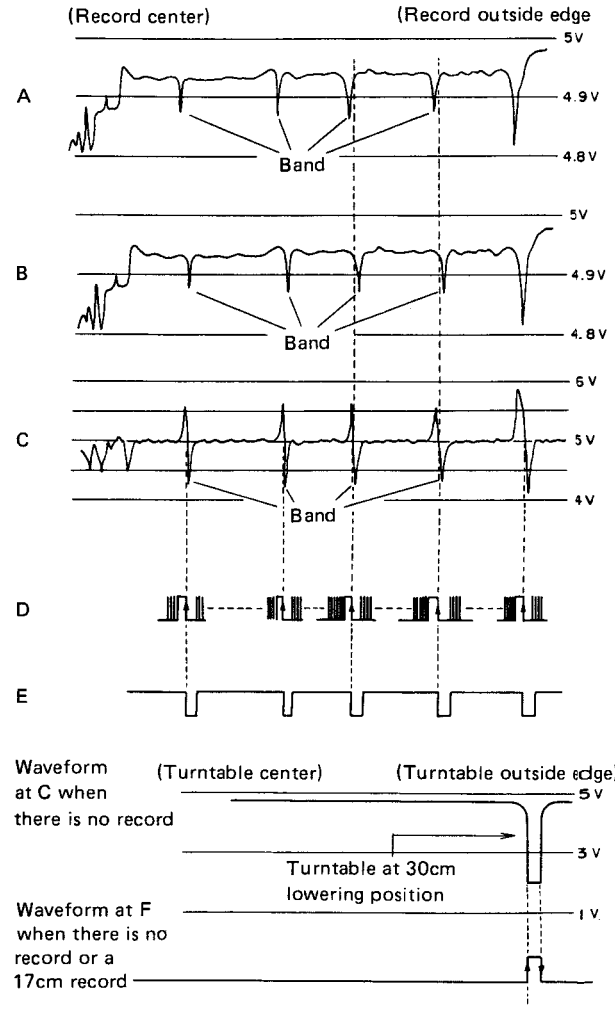


Fig. 5-5 Band sensor waveform

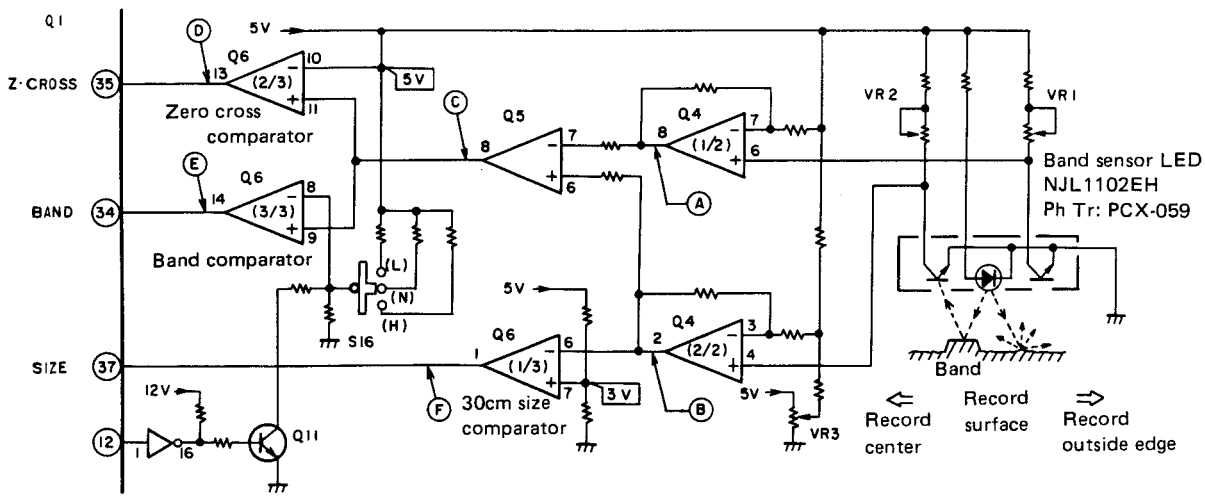


Fig. 5-4 Band Sensor Circuit

5.1.4 Elevation and Tonearm Circuits

The tonearm drive motor and EV solenoid are controlled by commands from the control IC (Q1), which also controls the horizontal and vertical movement of the tonearm. In addition to this, the IC controls tonearm tracking with the tracking sensor and tracking error signals.

- **EV solenoid drive**

The EV solenoid drive uses a large current at first to draw the plunger inside, and thereafter uses a lower current for holding the plunger in.

The signal to draw the plunger inside comes from the control IC (Q1), passes through the Q2 transistor array, and enters Q3 pin 7. This signal turns on the Q3 Darlington transistor, and approximately 170mA of current runs into the collector, turning on the EV solenoid which draws the plunger inside. Because of this, the tonearm will drop slightly. This "draw" signal from the control IC lasts about 1 second. Next, the hold signal, which was output at the same time as the draw signal, passes through the Q2 transistor array, enters Q3 pin 8 and turns on the Darlington transistor. When the draw signal ends, a current of approximately 70mA drawn from pin 9 holds the plunger inside, which keeps the tonearm elevation down until the hold signal ends.

- **Tonearm drive**

The tonearm drive is controlled by input to Q3 pin 4, pin 5, and pin 15. Their truth values are shown in Fig. 5-6.

- **Lead-in (locate-in)**

Q3 receives locate-in signals from the control IC (Q1), and with an output of approximately 0V from Q3 pin 14 (O1) and approximately 11V from pin 11 (O2), the tonearm motor begins turning in the lead-in direction.

- **Lead-out (locate-out)**

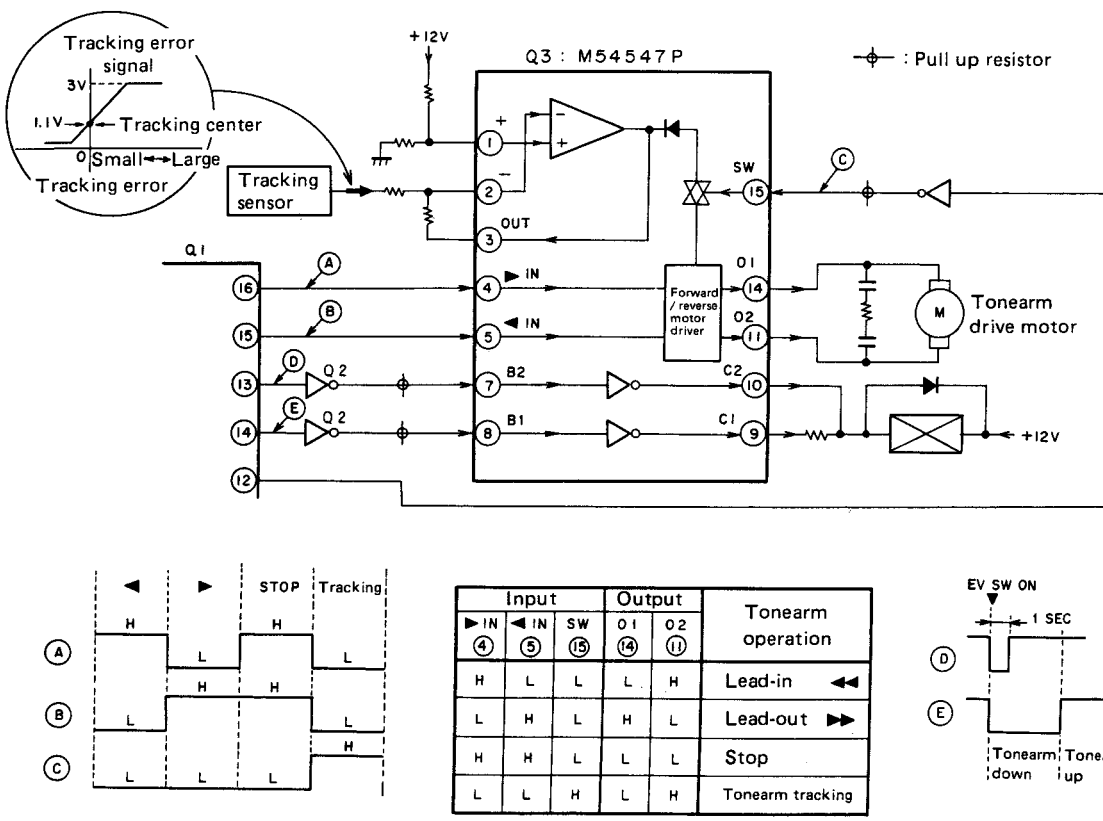
Q3 receives locate-out signals from the control IC (Q1), and with an output of approximately 11V from pin 14 and approximately 0V from pin 11, the tonearm motor begins turning in the lead-out direction.

- **Stop**

Q3 receives stop signals from the control IC (Q1), and with an output of approximately 0V from both pin 14 and pin 11, stops the tonearm motor.

- **Tracking**

Q3 receives tracking signals from the control IC (Q1), and between pin 14 and pin 11, outputs an amplified tracking error signal (amplified by an internal OP amplifier) and begins turning the tonearm drive motor in such a way as to correct the error.



Input			Output		Tonearm operation
▶IN ④	◀IN ⑤	SW ⑮	O1 ⑭	O2 ⑪	
H	L	L	L	H	Lead-in ◀◀
L	H	L	H	L	Lead-out ▶▶
H	H	L	L	L	Stop
L	L	H	L	H	Tonearm tracking

Fig. 5-6 Elevation and Tonearm Drive Circuit and I/O Truth Value Chart.

5.1.5 Key Matrix Circuit

The key matrix circuit reads the digit output (pins 22 to 25) of the control IC (Q1) from the Key IN terminal (pins 26 to 29) and distinguishes different key input signals with the control IC. In addition to carrying out key input operations, it lights LEDs with output from pins 17 to 19. Fig. 5-8 shows the output waves produced by switch matrix input in the following order: REP SW, Program SW 7, and EV SW.

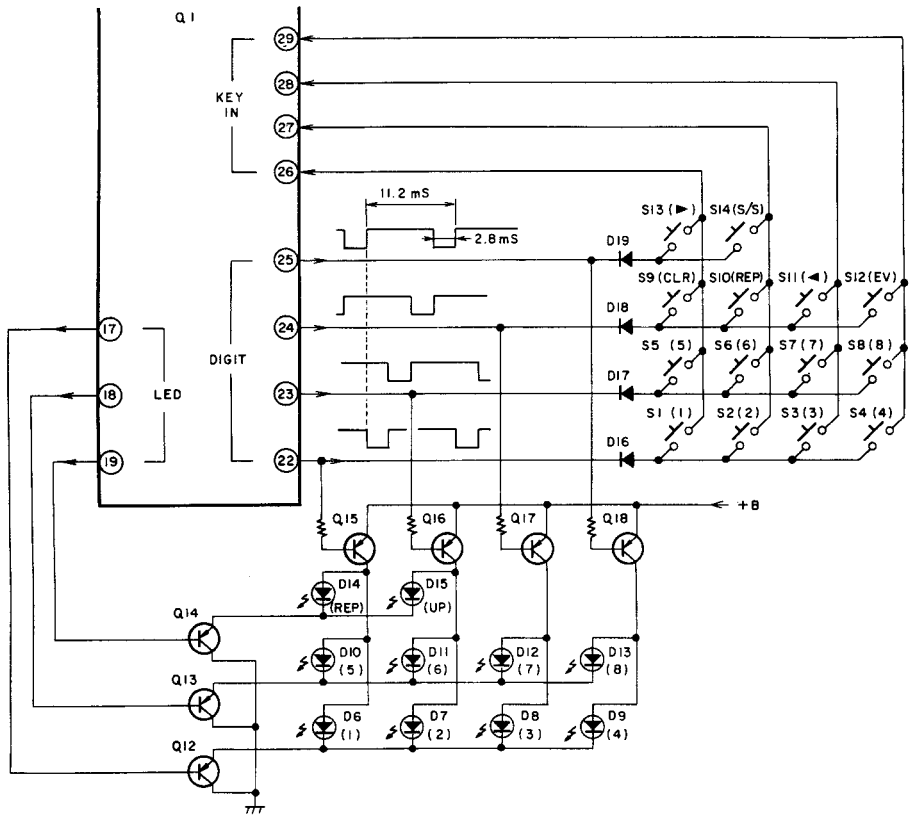


Fig. 5-7 Key Matrix Circuit

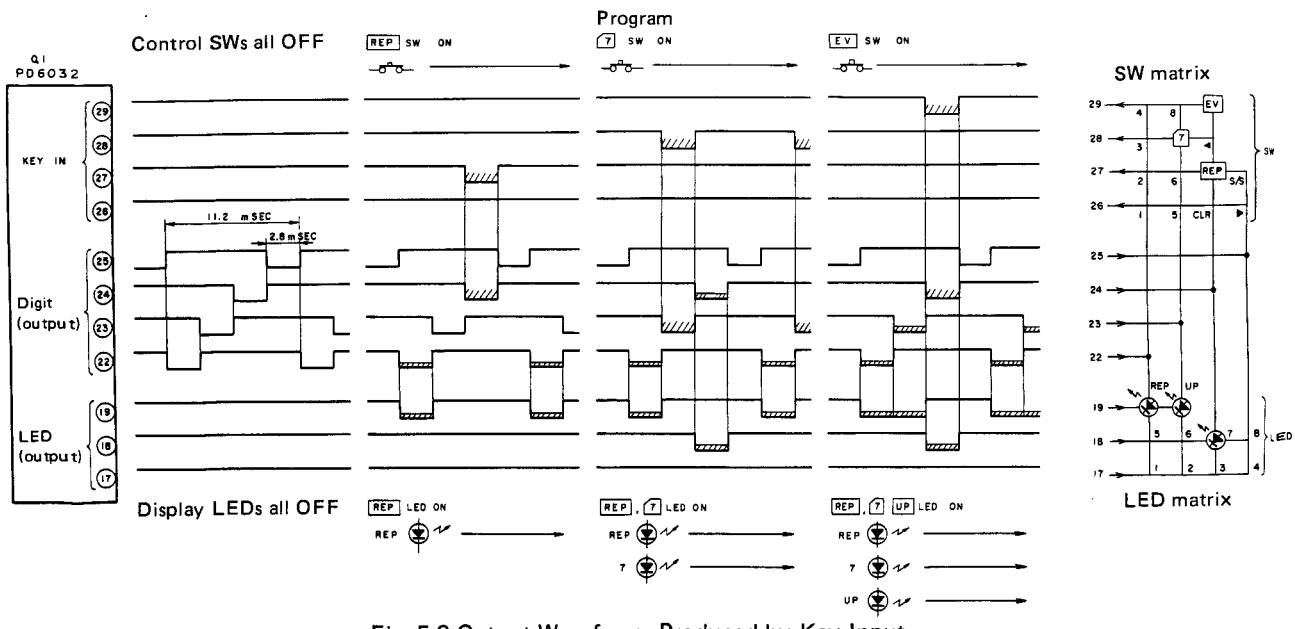


Fig. 5-8 Output Waveforms Produced by Key Input

5.1.6 Fader Circuit

The fader circuit controls audio performance using control signals from the fader deck.

- **Cross fade recording operation**

By pushing the synchronizer switch and the auto fader switch of the fader deck, the fader standby input will turn ON (L), allowing for synchronization of the fader.

When the program switch is used to choose the playing order, the unit goes into search mode, and after searching, the tonearm leads out to the first selection and goes into UP standby. If the fader deck source IN button is pushed at this time, the deck will send the player a fade I/O signal (trailing ↓) and the cross fade operation will begin. The player receives the signal (trailing ↓) and lowers the tonearm onto the record.

In the same way, when the tonearm is tracing and the fader deck tape IN (or the fade OUT) button is pushed, the fader performs the cross fade (or fade OUT) operation. When it finishes it sends the player a leading signal ↑. The player receives this signal and begins the +skip operation, and heads for the next selection. When the fader standby input is ON (L) the deck doesn't receive deck synchronizer output.

- **Synchronized REC operation**

Synchronized REC is an operation which uses the deck synchronizer output to turn the deck to REC and REC/PAUSE mode as soon as the stylus leaves the record surface. During this operation, the fader I/O input and the fader standby input are both OFF (L).

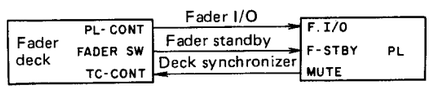


Fig. 5-9 Fader Deck and Connections

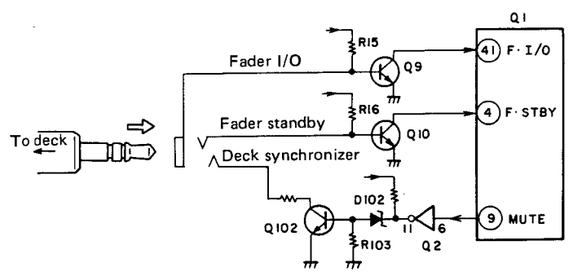


Fig. 5-10 Fader Circuit

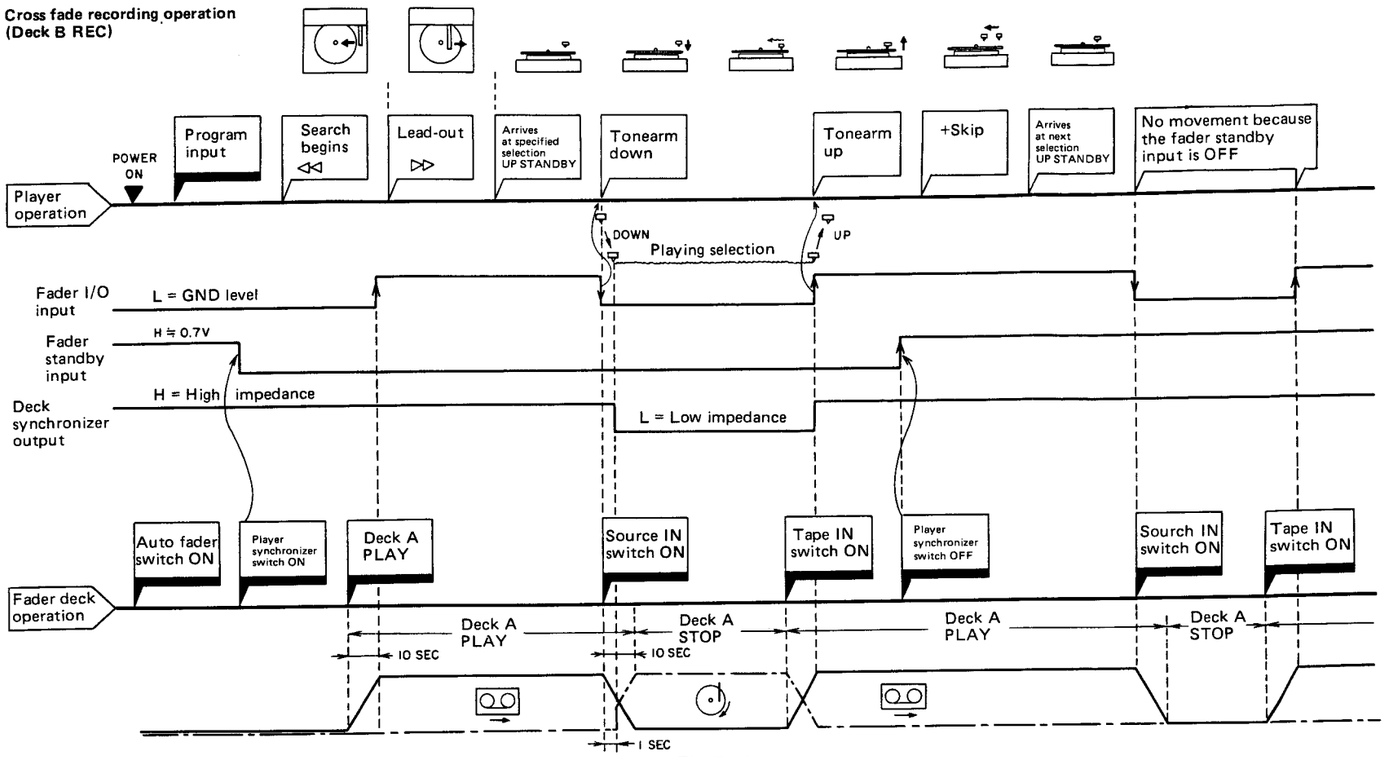


Fig. 5-11

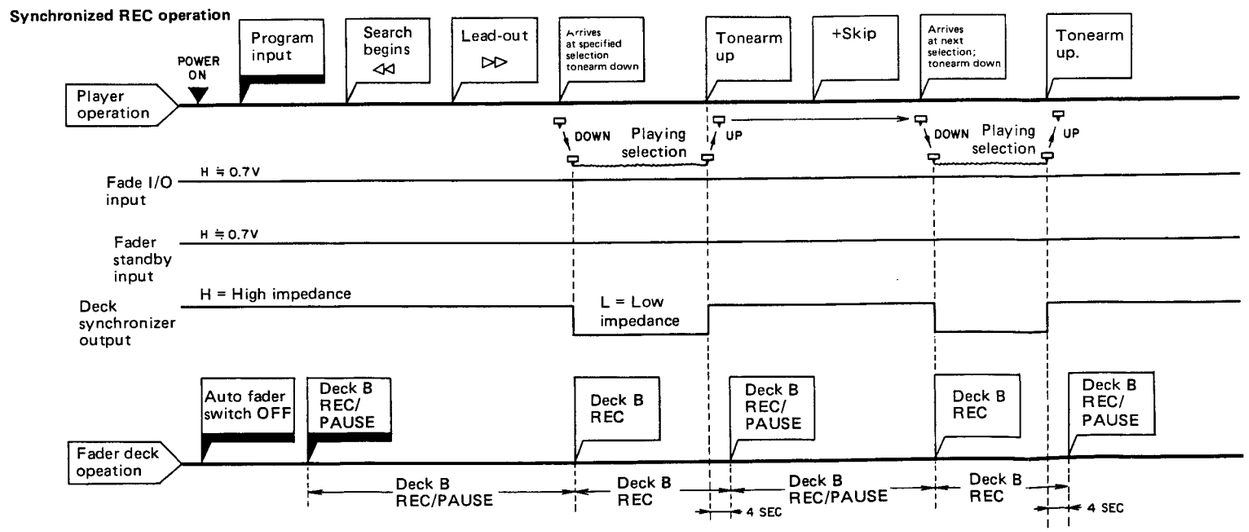


Fig. 5-12

5.1.7 Phono Motor Circuit

The phono motor of this player uses magnetism along the outside edge of the drive magnet to determine its rpm value. (Formerly, a separate magnet was needed in addition to the drive magnet.)

This motor uses a PA2017 as its control drive IC and a crystal oscillator circuit in the oscillator circuit unit. Also, since this motor is brushless and coreless, the position of the rotor magnet is detected by two Hall elements HA and HB, which make the motor turn by switching the current to the drive coil electronically. When voltage is applied to the whole elements HA and HB, a voltage differential is created in the output interval by the magnetic field of the approaching rotor. The Hall elements HA and HB are also attached 90° electrically out of phase so their output signals have a 90° phase difference. (See Fig. 5-13)

After the output voltage from the Hall elements have been amplified by the PA2017 Hall amplifier, it enters a position signal composite circuit (See Fig. 5-15). The output from the position signal composite circuit is then input into the respective drive amplifiers. The coil current at this time is as shown is figure 5-13 coils A and B. This current produces a magnetic field in the drive coil, and the polarity of the coil and the polarity of the rotor attract and repel each other causing the motor to start turning.

When the motor starts turning, the signal (approximately 0.5mV p-p) produced by a frequency generator (FG) in the mtor rotation unit, is amplified to about 0.3V p-p by an FG amplifier (Q5, Q6) and is input into the FG amplifier (input pin 17) inside PA2017. Possible frequencies at this point are 55.55 Hz for 33 rpm and 75 Hz for 45 rpm.

The signal then undergoes waveform shaping in the Schmitt transistor, and is then input into the reset circuit, the sample and hold circuit and finally the timing circuit for a timing pulse for the phase comparison circuit. In the PD0008, the crystal generated 6.144MHz frequency is divided into 1.5kHz (a division of 1/4096) by the frequency divider circuit. This signal is further divided by a dividing ratio selection circuit to 55.55Hz for 33 rpm (a division of 1/27) and to 75 Hz for 45 rpm (a division of 1/20). These pulses are output to PD0008 pin 15. This reference pulse from PD0008 and the signal from the timing circuit of PA2017 undergo phase comparison in the phase comparison circuit. Output pulses can then be made in reference to the phase difference. Because these pulses speed up the charging time constants of their output sections, P — V conversion takes place. Also, F — V conversion takes place in those sections of the sample and hold circuit and the reset circuit when there is no output pulse from the phase comparison circuit. As a result, voltage which has undergone P — V and F — V conversion is output to pin 8. This output is then amplified by the buffer amplifier and input into the V — I conversion circuit. The V — I conversion circuit controls the current that flows into the drive circuit based on the difference between the output of the buffer amplifier and the referance voltage (1/2VCC2).

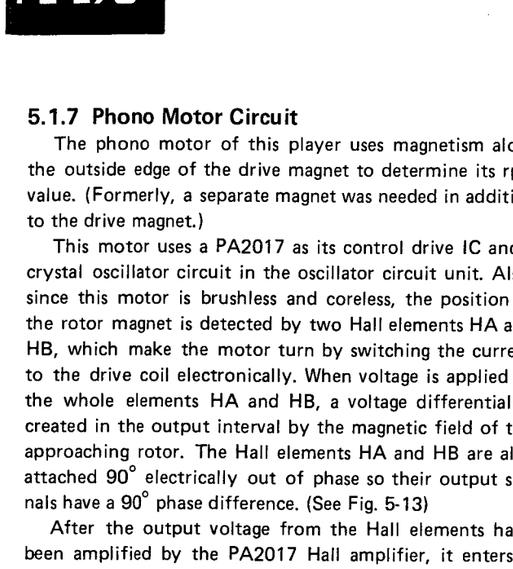


Fig. 5-13 Hall Elements and Coil Terminal Waveforms

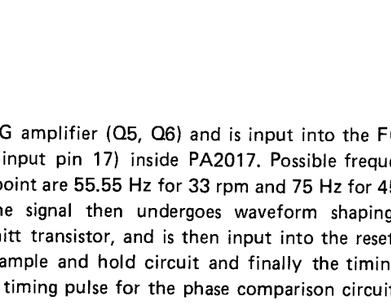


Fig. 5-14 V — I Conversion + Drive Circuit I/O Characteristics

When the motor has just begun truning, the F — V conversion voltage will be higher than the reference voltage, so current will flow into the drive coil, and the motor will speed up. Gradually, the motor will return to a constant rotation speed.

When the motor spins faster than regulation speed, both the P — V and F — V conversion voltage become lower than the reference voltage. This causes the current to stop flowing in the drive circuit and the rpms decrease because of a loss of torque.

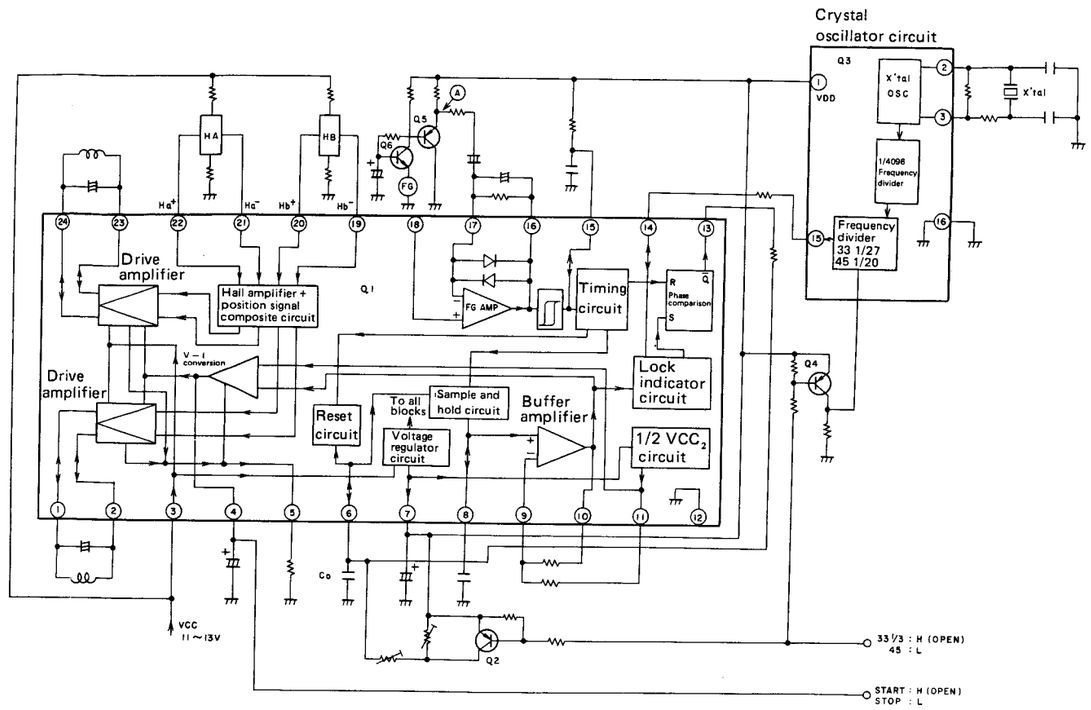


Fig. 5-15 Phono motor circuit

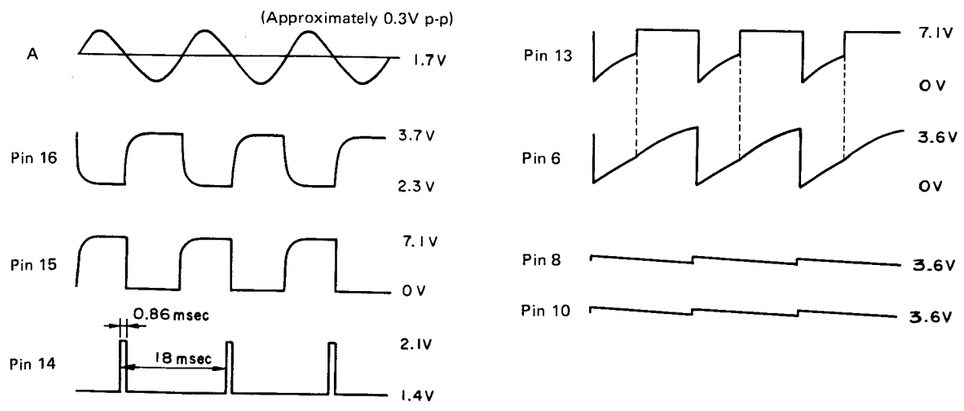


Fig. 5-16 Phono Motor Circuit Waveforms

5.2 CONTROL PANEL EXPLANATION

- **KEY SW (Control Switches)**

The control panel of this player is as shown in figure 5-17. It performs the following functions:

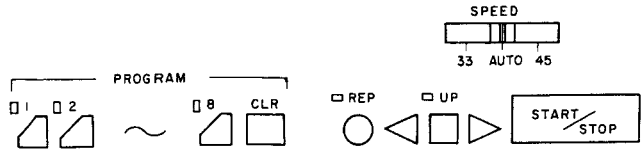


Fig. 5-17 Control Panel

5.2.1 POWER SW (Power Switch)

This switch turns on the power and resets the player. The tonearm will return to the rest. (The unit also resets when the cover is opened sending the tonearm back to the rest.)

- ○ The UP light is on All others are off.
- ○ The phono motor is stationary

5.2.2 SPEED SW (Speed Selector)

Sliding the speed selector to either 33 or 45 sets the phono motor rpms to 33 or 45 respectively. If the switch is set to AUTO and the cover is closed, and then set to fully automatic or program selection mode, then the player will select the motor speed automatically based on the size of the record.

Record size:

30 cm 33 1/3rpm
25 cm 33 1/3 rpm
17 cm 45 rpm

If you use the locate switch to play records manually (without using the automatic or program selection functions), the turntable will play all records at 33 1/3 rpm while the speed selector is in the AUTO position. If the cover is opened after the size has been set, the rpm setting will be reset to 33 1/3 rpm. (However, if the speed selector is set to 33 or 45, then the rpm setting will not change even when the cover is opened.)

5.2.3 1 – 8 SW (Program Selection Switches)

- These are pressed for program selection.
- Selection repeat (up to 8 times) and programming (up to 15 steps) are possible.
- Pressing any of the buttons 1 through 8 will cause the tonearm to begin to search. It will move from the rest to the end of the record. When it has finished, the LED display will begin to blink, and the tonearm will proceed to the first selection on the program. However, if the tonearm has already searched after the cover is closed, then the LED display will start blinking without an additional search taking place. It will proceed directly to the first selection on the program. (If the cover is opened, however, that search data will be cleared.)
- It is possible to add more selections to the program at any time. (Regardless of whether the tonearm is leading-in, tracing or searching.) Moreover, when the selections have finished, or when the tonearm is returned by pressing the S/S SW, it is possible to reprogram selections even with the cover open. The tonearm will return to the rest, and if the cover is closed, it will begin to lead in or search.
- Reprogramming is not possible during fully automatic selection playing.

5.2.4 CLR SW (Clear Switch)

- Pressing this button clears all previously programmed selections.
- It can be used at any time. When a program has been cleared, the player returns to normal, fully automatic selection playing.

5.2.5 REP SW (Repeat Switch)

- This switch is used to repeat (or stop repeating) a selection.
- A selection may be repeated up to a maximum of 8 times. (During both program selection and fully automatic selection playing.) The LED display will start blinking when the eighth repeat has been programmed.
- It can be used at any time. (It turns ON or OFF with each press of the button.) When the unit receives a "REP ON" command after it has finished playing a selection, or when the tonearm is returning after pressing the S/S switch, it will interpret this to mean that it should repeat starting with the next selection. When the "REP ON" command is made (except when the tonearm is on the rest) the player will first finish playing the entire side (when on automatic) or complete the entire program (when on program), return to the rest, and then lead in again.

5.2.6 EV SW (Cueing Switch)

- This switch raises and lowers the tonearm.
- The cueing switch will respond when the tonearm is all the way UP or tracing (all the way down, or moving down). When it is all the way up, it will respond to a down command, and when it is tracing, or moving down, it will respond to an up command. It won't respond to commands at any other time.

5.2.7 S/S SW (Start/stop switch)

- This switch is used to begin automatic playing and to end automatic or programmed playing.
- It can be used at any time.

  When the cover is open:

  All programming and repeat commands will be cleared.

  When the cover is closed:

  If the tonearm is on the rest, automatic playing will begin.

  When the tonearm is not on the rest, playing will stop and any repeat commands will be cleared. The tonearm will then return to the rest.

5.2.8 ◀◀, ▶▶SW

This switch has two separate functions

1. Function 1 . . . Locate.

During automatic playing (when the tonearm is on the rest and the player is started using the S/S SW) and during manual playing (when the tonearm is on the rest and the player is started using the ◀◀ SW), this switch performs a locate function.

◀◀SW ON . . . The tonearm will move toward the center of the record.

▶▶SW ON . . . The tonearm will move toward the outside edge of the record.

2. Function 2 . . . Skip

During programmed playing (when the player is started using the program SW), this switch performs a skip function.

◀◀SW (+SKIP) . . . Player stops playing present selection and goes on to the next. It will skip one selection for each time it is pushed.

▶▶SW (–SKIP) . . . When pressed once it will return to the beginning of the present selection. If pressed N times, then it will go back N – 1 selections.

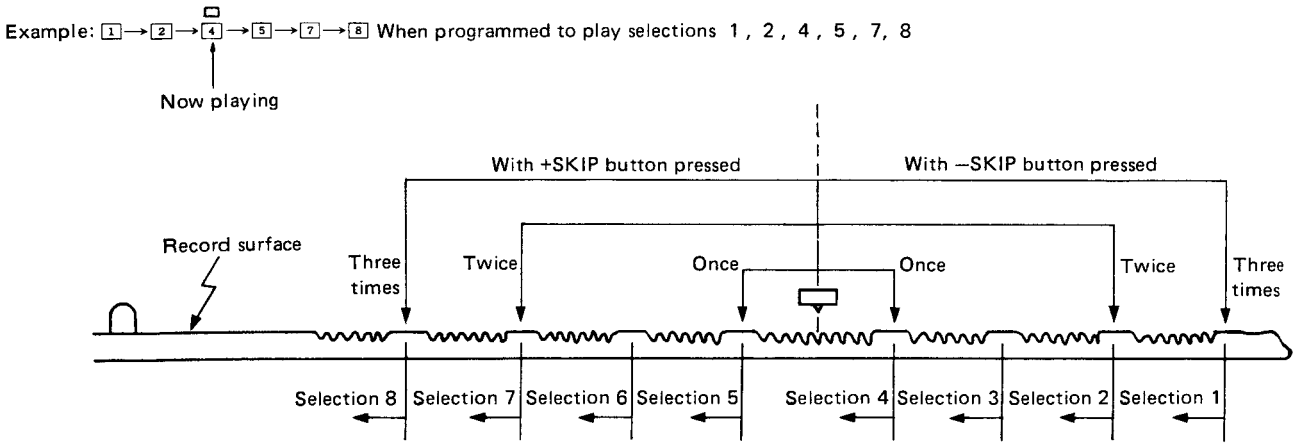
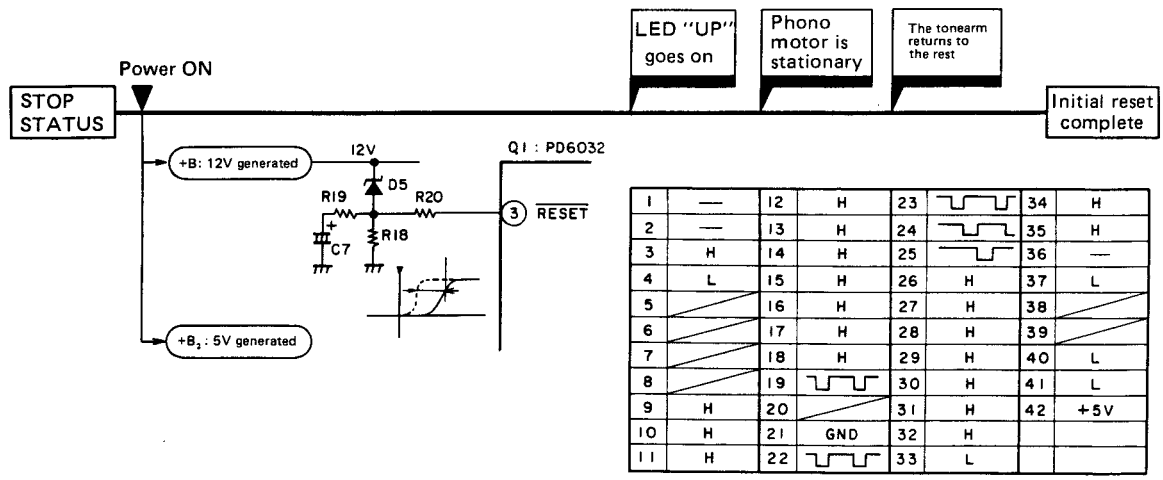


Fig. 5-18

5.3 MODE TRANSITION

5.3.1 Initial Reset



1	—	12	H	23	⊓⊔⊓	34	H
2	—	13	H	24	⊓⊔L	35	H
3	H	14	H	25	⊓⊔	36	—
4	L	15	H	26	H	37	L
5		16	H	27	H	38	
6		17	H	28	H	39	
7		18	H	29	H	40	L
8		19	⊓⊔⊓	30	H	41	L
9	H	20		31	H	42	+5V
10	H	21	GND	32	H		
11	H	22	⊓⊔⊓	33	L		

Fig. 5-19

5.3.2 Mode Transition Chart 1

- **When using automatic playing (no standby input)**

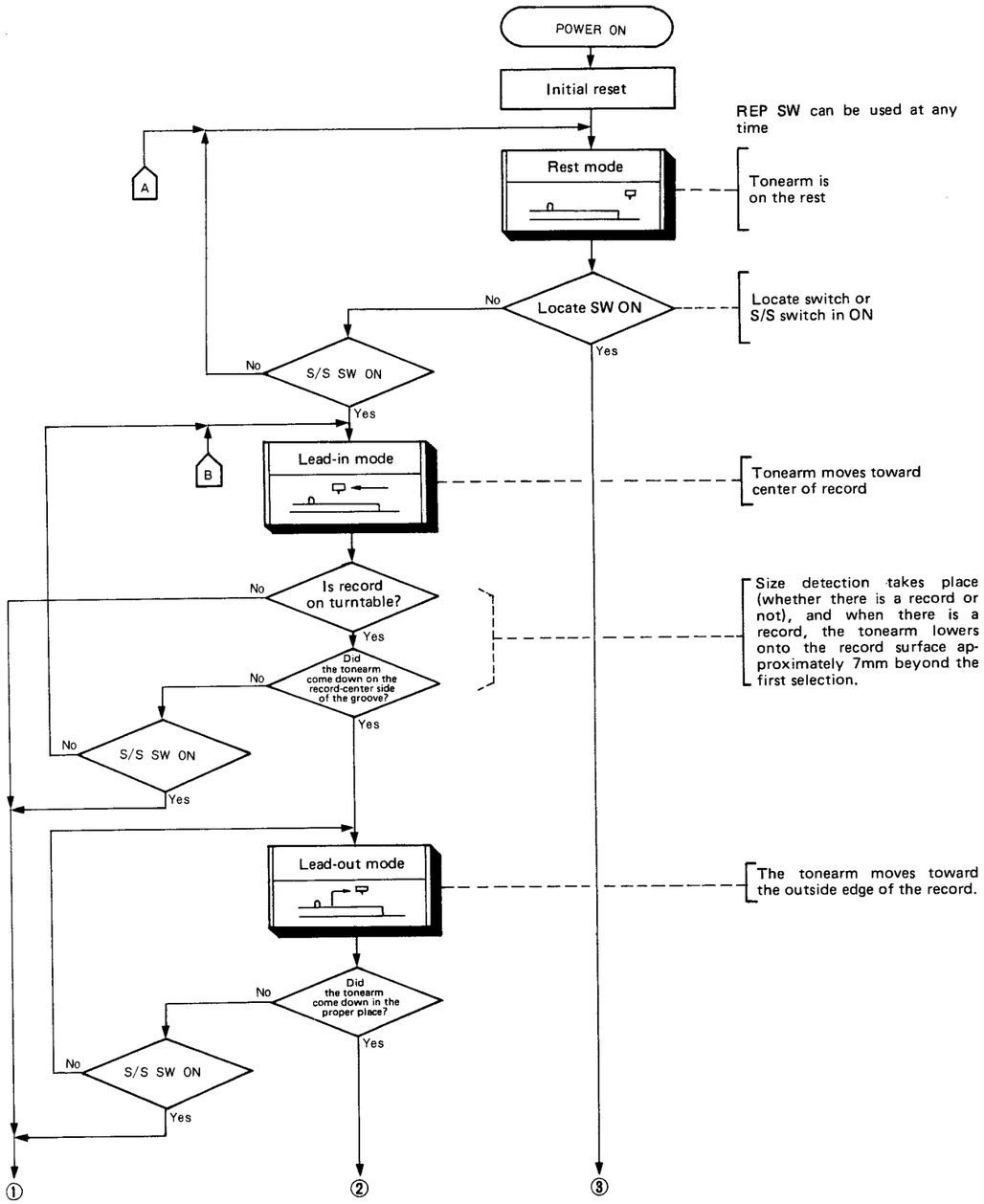


Fig. 5-20-1

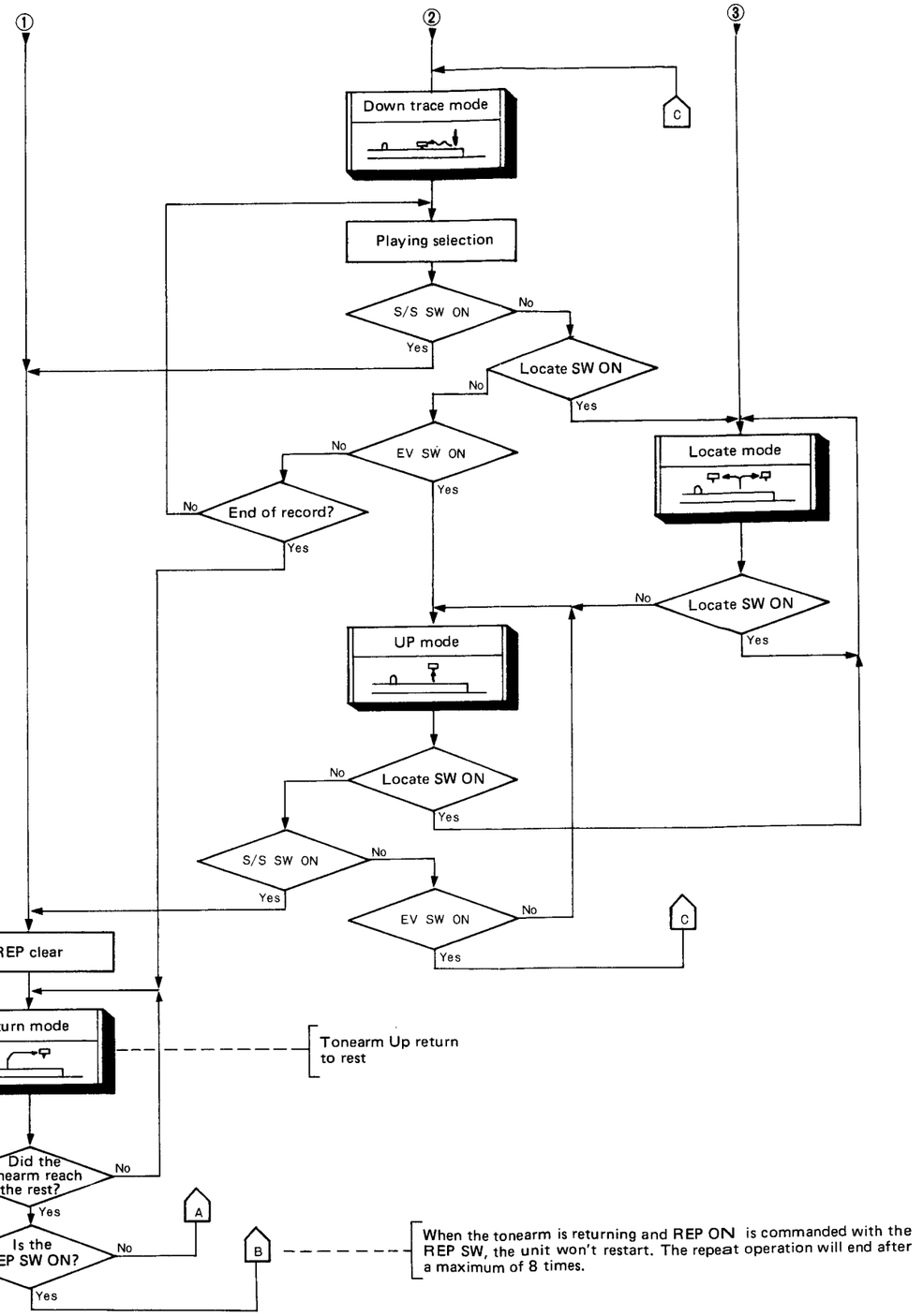


Fig. 5-20-2

5.3.3 Mode Transition Chart 2

- **Using programmed playing (no standby input)**

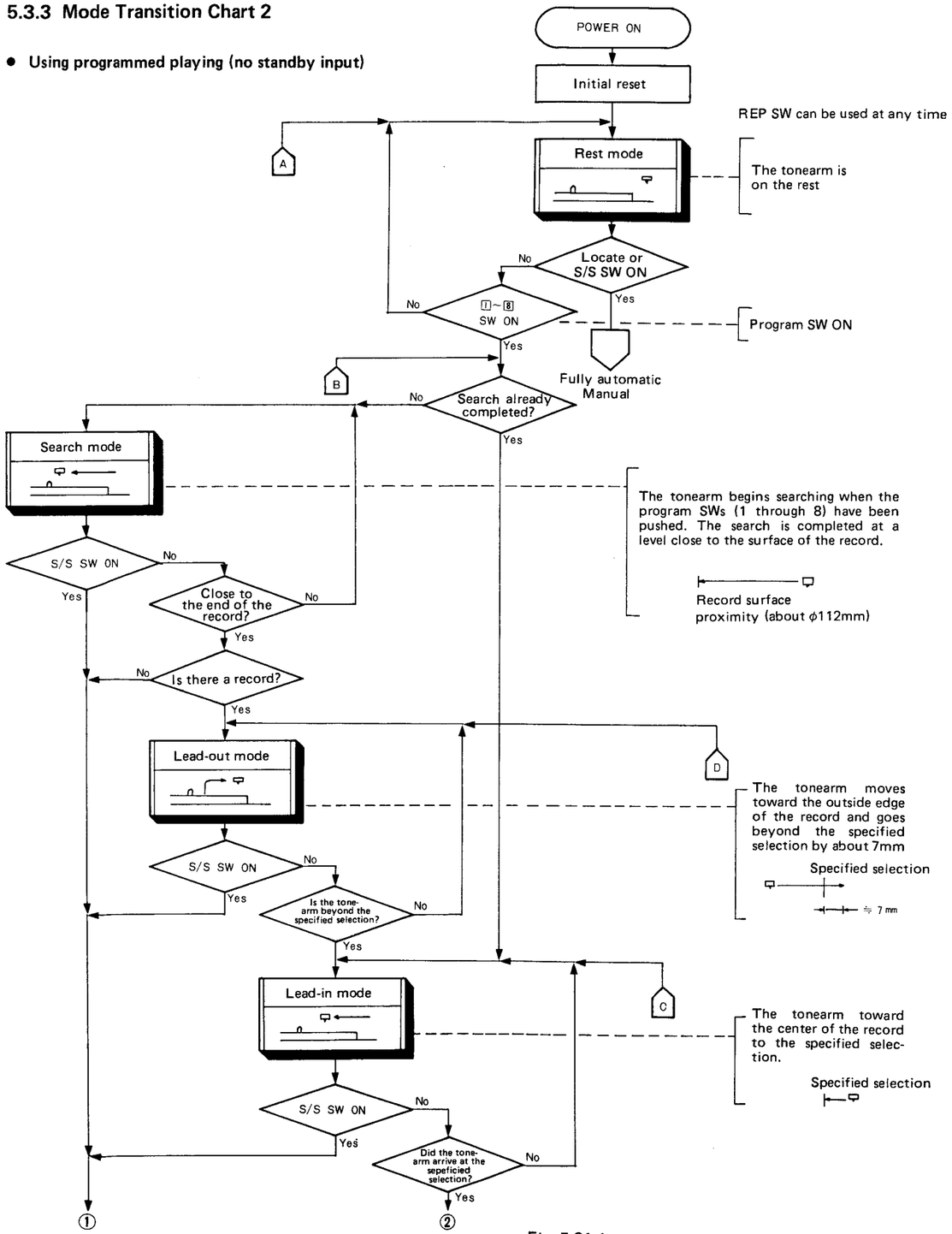


Fig. 5-21-1

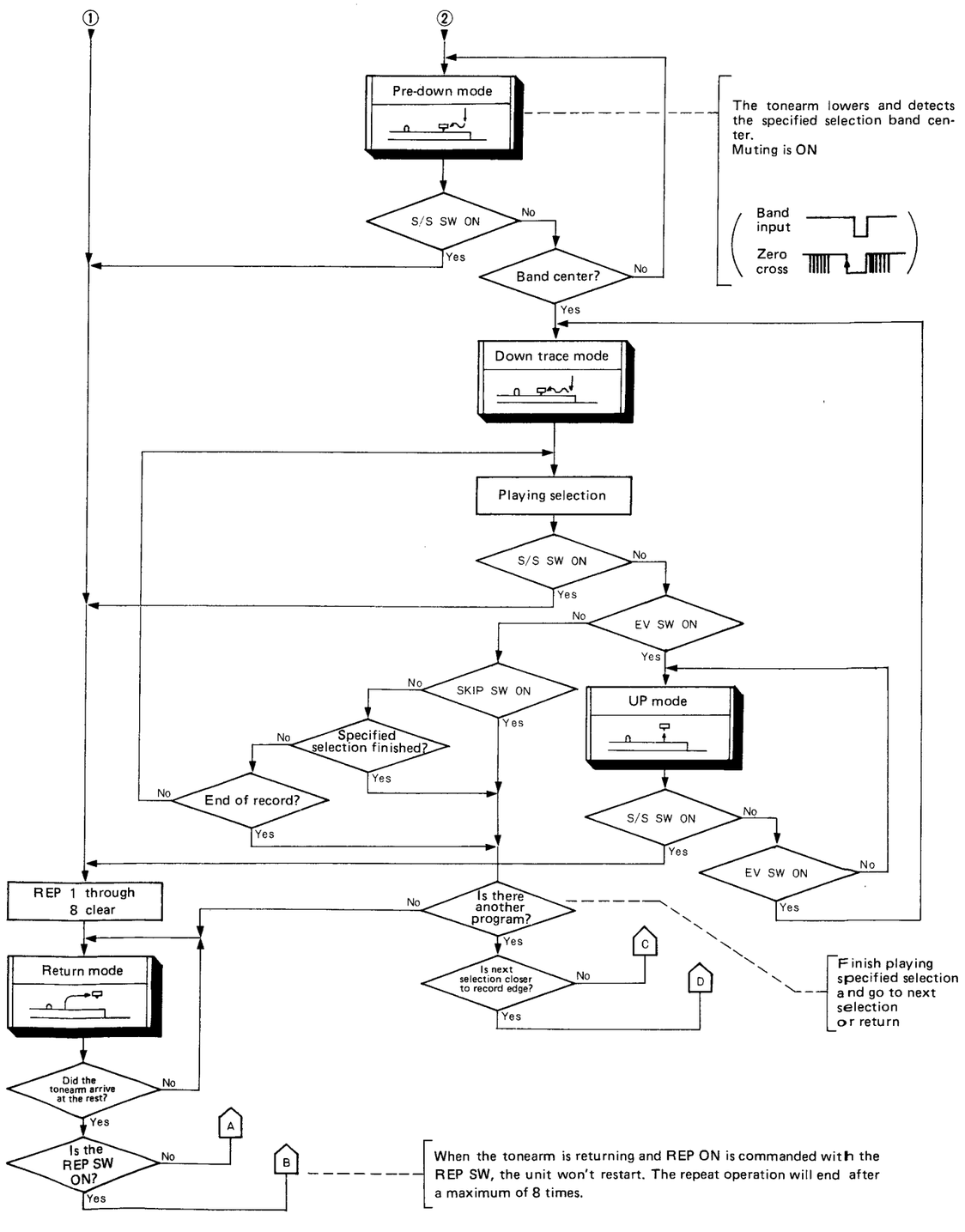


Fig. 5-21-2

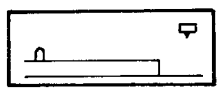
5.4 OPERATION MODE EXPLANATIONS

5.4.1 Power ON

When the power is turned on or the cover is opened, the PL-L70 performs the following operations.

1. It returns the tonearm to the rest.
2. It turns off the program display (1 through 8) and the REP display LEDs and turns on the UP display LED.
3. It stops the phono motor rotation.
4. It turns the muting on.

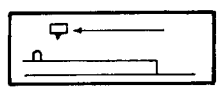
5.4.2 Rest Mode



With the PL-L70 on and awaiting input, all of the functions work with the exception of the EV SW. During the rest mode, the buttons, when pushed, perform the following functions.

1. SWs 1 through 8
   Pushing any of these will start the search mode.
   When searching has already been completed the lead-in mode will begin.
2. REP SW
   This turns the repeat function ON and OFF alternately.
3. ◀◀ SW
   This turns the turntable and moves the tonearm toward the record center. With manual playing, it works as a locate SW.
4. S/S SW
   This starts the lead-in operation during automatic playing. (The turntable rotates and player switches to lead-in mode)

5.4.3 Search mode



It does the following while moving the tonearm from the rest to the center of the record.

1. It determines the size of the record. (And the speed as well)
2. It records the band address.
3. It detects programmed selection.

When the speed SW is set to AUTO, the speed for 30cm and 25cm records is 33rpm. When the search mode detects a 17cm record, then it sets the speed to 45rpm. However, at this point, the turntable is not yet spinning.

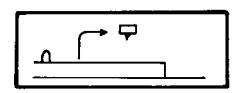
When the tonearm gets to the 17cm size area and detects no record, it then clears the program and repeat (s) (if any) and returns to the rest. (Switches to return mode.)

When the tonearm comes to the end of a record and it has a programmed selection number that is higher than the actual number of record selections, it clears those numbers from its memory and begins the lead-out operation. (Switches to lead-out mode) For example, if the number of actual selections that a record has is 6, and more than 7 selections are programmed, then the numbers above 6 are cleared from the memory.

In the search mode, all functions work with the exception of EV, ◀◀, ▶▶ SWs.

1. SWs 1 through 8
   Repeat input is possible, and up to 15 steps can be programmed into the PL-L70.
2. CLR SW
   It clears everything in the memory, and the search operation will continue.
3. REP SW
   It turns the repeat ON and OFF alternately.
4. S/S SW
   It clears programmed selections and/or repeats and starts the return operation. (Switches to return mode.)

5.4.4 Lead-out Mode



- **During automatic playing**

This moves the tonearm toward the outside edge of the record until it addresses the first selection. Then depending on whether or not there is fader standby input operates in the following manner.

1. With fader standby
   It stops moving the tonearm, and holds it UP and waits for fader DOWN input. (Switches to UP mode)
2. Without fader standby
   It stops moving the tonearm, and starts to move it DOWN. (Switches to down trace mode.)

- **During programmed selection playing**

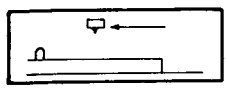
If the EV is DOWN, then it brings the tonearm UP and moves it toward the outside edge of the record. However, depending on whether it is pushed during the first selection of a program or after that, the operations change.

1. When pushed during the first selection of a program.
   It moves the tonearm to the address of the first selection, and thereafter operates as with automatic selection playing.
2. When pushed during subsequent selections of a program.
   It moves the tonearm back 64 address units from the selection address (approximately 7.3mm toward the outside edge of the record) where it changes direction and begins the lead-in operation. (Switches to lead-in mode.)

In the lead-out mode the REP and S/S SWs work, but the other functions, program SWs (1 through 8) and the CLR only work during programmed selection playing.

1. REP SW
   This turns the repeat ON and OFF alternately.
2. S/S SW
   This clears any programming and/or repeat(s) and starts the return operation. (Switches to the return mode.)
3. SWs 1 through 8
   These permit repeating the same selection and the addition of more programming (up to 15 steps) during programmed selection playing.
4. CLR SW
   This clears programming. After that, it switches to automatic playing. (It starts leading out to the first selection.

5.4.5 Lead-in Mode



- **During fully automatic playing**

If the size of the record has not yet been determined, the tonearm does this while moving to the address of the first selection +64 address units, (approximately 7.3mm closer to the center of the record). There it changes direction and begins to lead out. (Switches to lead-out mode.)

- **During programmed selection playing**

This mode moves the tonearm toward the center of the record. Depending on whether the button is pushed during the first selection of a program or during subsequent selections, the operations change as follows.

1. When pushed during the first selection of a program. It moves the tonearm to the address of the first selection +64 address units (approximately 7.3mm toward the center of the record), changes direction, and starts to lead out. (Switches to lead-out mode.)
2. When pushed during subsequent selections of a program. It moves the tonearm toward the center of the record, to the programmed selection address −16 address units (approximately 1.8mm toward the outside edge of the record), where it begins detecting the band. The next operation depends on whether or not there is fader standby or not.

1. When there is fader standby
   While moving the tonearm toward the center of the record it detects a leading singnal ( ) as in figure 5-22. The tonearm stops during this process and waits for a fader down input signal in the UP position. (Switches to the UP mode.)

2. Without fader standby
   While moving the tonearm toward the center of the record it detects a trailing signal ( ) as shown in figure 5-22. The tonearm stops when it has detected the signal, and then lowers. (Switches to pre-down mode.)
   With or without fader standby when the tonearm doesn't detect a band even after going to the programmed selection address +16 address units (about 1.8mm closer to the center than the band) then it begins leading out. (Switches to lead-out mode.)
   When the tonearm has not detected the selection band after repeating the lead-in/lead-out sequence 4 times it goes on to the next programmed selection.

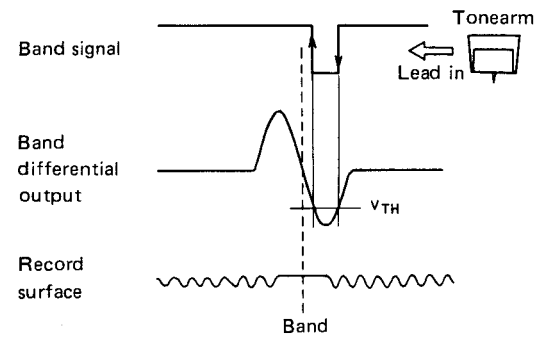
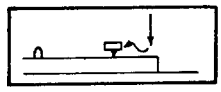


Fig. 5-22

In the lead in mode, as with the lead out mode, the REP and S/S switches work, but the other functions, program switches (1 through 8) and the CLR only work during programmed selection playing. The operations performed after the commands are received are the same as with the lead out mode.

5.4.6 Pre-down Mode



The pre-down mode is the mode which moves the tonearm down after the band has been detected by the lead-in mode (during programmed selection playing for all selections except the first). After the tonearm goes down, it traces the air with the muting ON until it finds the center of the band (zero cross).

Then the tonearm goes down, a landing sensor starts the tracking when the tonearm comes to rest on the record. When the zero cross input H is detected while tracking, the muting is turned off and normal tracing begins. (Switches to down trace mode.)

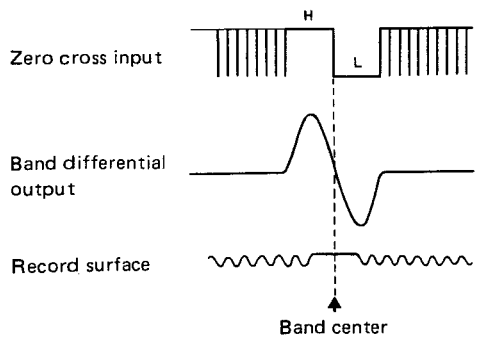
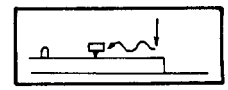


Fig. 5-23

In the pre-down mode: when the:
Fader standby input is ON and
Fader skip input is present,
the tonearm begins leading out (Switches to lead-out mode.) In order to continue to the next programmed selection. In the pre-down mode all of the input SWs function.

1. SWs 1 through 8
   Selection repeat ispossible, and up to a maximum of 15 steps are programmable.
2. CLR switch
   Clears all programming. After that it switches to automatic playing.
3. REP switch
   Turns the repeat function ON and OFF alternately.
4. EV switch
   Starts the UP operation. (Switches to UP mode.)
5. ◀◀, ▶▶SW
   Starts the +SKIP and −SKIP operations. (Switches to the lead out-mode.)
6. S/S SW
   Clears programmed repeat(s) and starts the return opeation. (Switches to the return mode.)

5.4.7 Down Trace Mode



- **With fully automatic playing**

  It turns off the UP LED and sets the tonearm down.
  During the first second of lowering the tonearm, the elevation solenoid draws a current of 170mA. After that, it draws 70mA.

  The landing sensor determines whether or not the tonearm is in contact with the record. When it senses that it is, it begins to watch for the end.

  When it has detected the end, it checks the repeat LED, and if there are any repeats, it counts them and begins the return operation. (The maximum number of repeats is 8, and the repeat LED will begin blinking when the number of repeats reaches 8.) (It then switches to the return mode.)

  During fader standby, it will begin the return operation if there is fader standby input. (Switches to return mode.)

- **With programmed selection playing**

  As with fully automatic playing, the UP LED is turned off and the tonearm is lowered. When the landing sensor comes to rest on the record, it turns OFF the muting and turns ON the tracking. With the position of the tonearm within ϕ125mm the sensor watches for the end.

  When switching to this mode from the pre-down mode, the muting is switches to OFF. (There are no other changes.)

  While tracing with the tracking on, this mode watches the tonearm position address and when it comes to the band at the end of the selection it is playing − 16 address units (approximately 1.8mm from that band toward the outside edge of the record) it starts the band sensor.

  When it detects the middle of a band (at the end of the record it detects the end), it truns ON the muting, and lifts the tonearm up in order, to continue on to the next selection in the program. (Switches to lead-out mode.) However, if the fader standby input is ON, then the tonearm will raise UP and switch to the lead-out mode for every selection.

  During programmed selection playing and the down trace mode when the:
  Fader standby input is ON and
  fader skip input is present.
  then the tone arm begins the +SKIP operation.

When all of the programmed selections have finished, this mode checks the number of repeats and then, if there are any, begins the repeat opeation. (Switches to the return mode) (The maximum number of repeats is 8, and when the number of repeats reaches 8 the REP LED begins blinking.)

With down trace all of the functions work during programmed selection playing, and with automatic playing all functions work except the program switches and the clear SW.

1. REP SW
   It turns the repeat function ON and OFF alternately.
2. EV SW
   It starts the UP operation. (Switches to UP mode.)
3. S/S SW
   It clears and programming and/or repeats and/or repeats and starts the return operation. (Switches to the return mode.)
4. ◀◀, ▶▶ SW

- **With programmed selection playing**

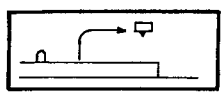
  Starts the +SKIP and −SKIP operations. (Switches to the lead-out mode.)

- **With fully automatic playing**

  Starts the UP operation. (Switches to the UP mode.) The following function only operate with programmed selection playing.

5. SWs 1 through 8
   Selection repeat and up to 15 steps of additional programming is possible.
6. CLR SW
   Clears programmed selections and switches to automatic playing.

5.4.8 Return Mode



If the tonearm is DOWN (EV DOWN) then it lifts it UP, stops the turntable, and returns the tonearm to the rest.

If the repeat SW is ON, (Except when turned to during return) then at the same time that the tonearm returns to the rest, it will start the turntable rotating in order to play the next selection, and begin leading in the tonearm. (Switches momentarily to the lead-out mode and then to the lead-in mode.)

At times other than these, (i.e. turning the REP SW ON during return) the tonearm will be at the rest on standby unless there is a command to start from one of the program SWs or the S/S SW. (Switches to the rest mode.)

When the playing has finished, or has been terminated, the program switches 1 through 8 still function while the tonearm returns to the rest, and when the search operation has not yet been completed, (i.e. the cover was opened during tonearm return) then the search operation will begin. (It will switch to the search mode.) If the search operation has been completed the lead-in operation will begin. (It will switch to the lead-in mode.) When the cover is open, the tonearm will remain at the rest until the cover is closed.

In the return mode, the operable switches differ depending on whether it is a return that takes place during a repeated selection, or a return that takes place at the end or middle of a selection.

- **With a return during a repeated selection. (REP SW ON)**

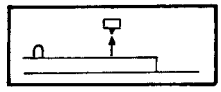
  (During automatic or programmed selection playing.)

1. REP SW
   It turns the repeat function ON or OFF alternately. (Cancels the repeat selection.)
2. S/S SW
   This clears the programmed selections and/or repeats. (Cancels the repeat selection.)
   (This works with programmed selection playing, but not with fully automatic playing.)
3. SWs 1 through 8
   Selection repeat and up to 15 steps of additional programming are possible.
4. CLR SW
   Clears all programmed selections and then switches to automatic repeat playing.

- **With a return at the end or middle of a selection**

1. SWs 1 through 8
   Repeat input is possible, and up to 15 steps of new programming is possible.
2. CLR SW
   This clears all programmed selections.
3. REP SW
   This turns the repeat function ON and OFF alternately.
4. S/S SW
   Clears all programmed selection and/or repeats.

5.4.9 UP Mode



This mode lights the UP LED, turns ON the muting and raises UP the tonearm. When the EV chip and the EV bar make contact and the stylus leaves the surface of the record, the landing sensor detects this and turns OFF the tracking. Then, after about 1.1 seconds it detects that the tonearm has moved UP.

Function that will work when the tonearm is UP and when it is moving UP differ depending on whether the playing is fully automatic or programmed selection.

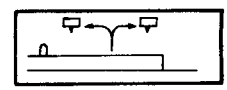
- **During fully automatic playing**

1. The CLR SW and 1 through 8 don't function.
2. REP SW
   Turns the repeat function ON and OFF alternately.
3. EV SW
   - When the tonearm is moving UP . . .no response.
   - When the tonearm is UP . . . . . .the down operation takes place. (Switches to down trace mode.)
4. ◀◀, ▶▶SW
   - When the tonearm is moving UP . . .no response.
   - When the tonearm is UP . . . . . .the locate operation begins. (Switches to locate mode.)
5. S/S SW
   It clears the repeats and starts the return operation. (Switches to the return mode.)

- **During programmed selection playing**

1. SWs 1 through 8
   Selection repeat and up to 15 steps of additional programming are possible.
2. CLR SW
   Clears all programmed selections, and then switches to fully automatic playing.
3. REP SW
   Turns the repeat function ON and OFF alternately.
4. EV SW
   - When the tonearm is moving UP . . no response.
   - When the tonearm is UP . . . . . the down operation takes place. (Switches to down trace mode.)
5. ◀◀, ▶▶SW
   - When the tonearm is moving UP . . it begins ± SKIP operations. (Switches to the lead-out mode.)
   - When the tonearm is UP . . . . . .no response.
6. S/S SW
   Clears all programmed selections and/or repeats and begins the return operation. (Switches to return mode.)
   During the UP mode or when the tonearm is UP during programmed selection playing and the
   Fader standby is . . . . . ON and
   Fader input is . . . . . present,
then the tonearm down operation will begin. (It will switch to down trace mode.)

5.4.10 Locate Mode



The locate mode is a passing mode that works during programmed selection playing when the ◀◀ SW or the ▶▶ SW is pushed and held.
When the ◀◀ SW is ON,
The tonearm moves toward the center of the record. (up to approximately ϕ106mm)
When the ▶▶SW is ON,
The tonearm moves toward the outside edge of the record. (up to the rest)
When the ◀◀ / ▶▶ SW is OFF, the tonearm stops, and goes into the UP position. (Switches to the UP mode.)

- Do not Push 2 buttons at the same time with the PL-L70, regardless of the modes. None of the input will be accepted when two function buttons are pushed at the same time. (However, it is possible to change the 33/45 speed while performing another function.)

Modes and the corresponding operable functions

Prog . . . Programmed selection playing
Full . . . Automatic playing

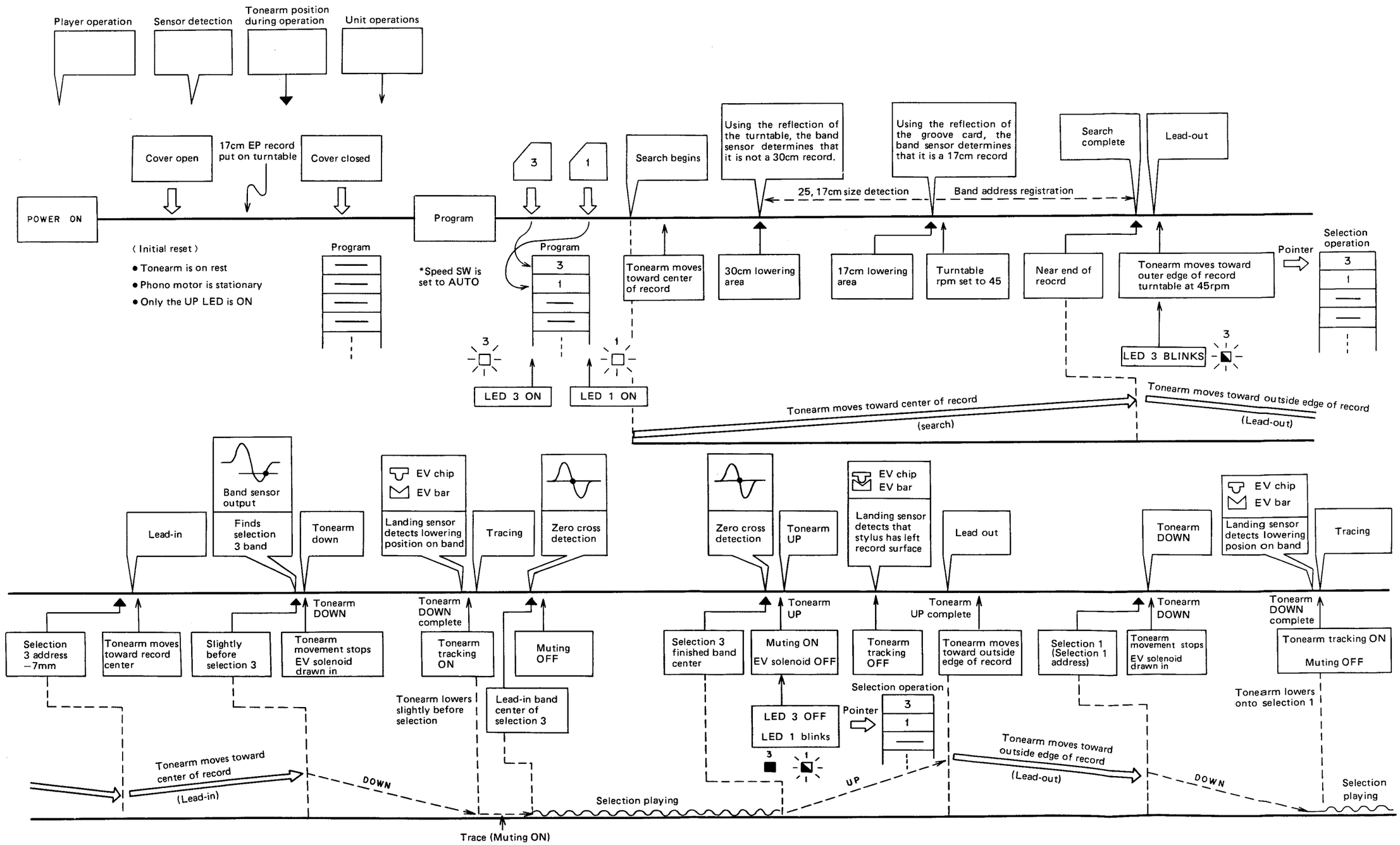
Switch name / Mode	Program 1 through 8	Clear CLR	Repeat REP	Tonearm elevation EV	Start/stop S/S	Locate/skip +SKIP ◀◀	Locate/skip −SKIP ▶▶
Rest mode	Search system (Search) ○ / Search system (Lead-out) ○	○	○	×	(Lead-out)	(Locate)	
Search mode	○	○	○	×	(Return)	×	
Lead-out mode	Prog ○ / Full ×	○	○	×	(Return)	×	
Lead-in mode	○	×	○	○	×	(Return)	×
Pre-down mode	○		○	○	(U P)	(Return)	(Lead-out)
Down trace mode	○	×	○	○	(U P)	(Return)	Prog (Lead-out) / Full (U P)
Return mode	○	×	○	○	×	(Return)	×
UP mode	○	×	○	○	(Down trace)	(Return)	×
Locate mode	——	——	——	——	——	——	——
(With cover open)	○	○	○	×	*○	×	

(——Do not push two function buttons at the same time.)
(* Clears 1 through 8)
(○= Yes, X = No)

Fig. 5-1

5.5 OPERATION CHART

17 cm EP record Programmed to go from selection 3 to selection 1

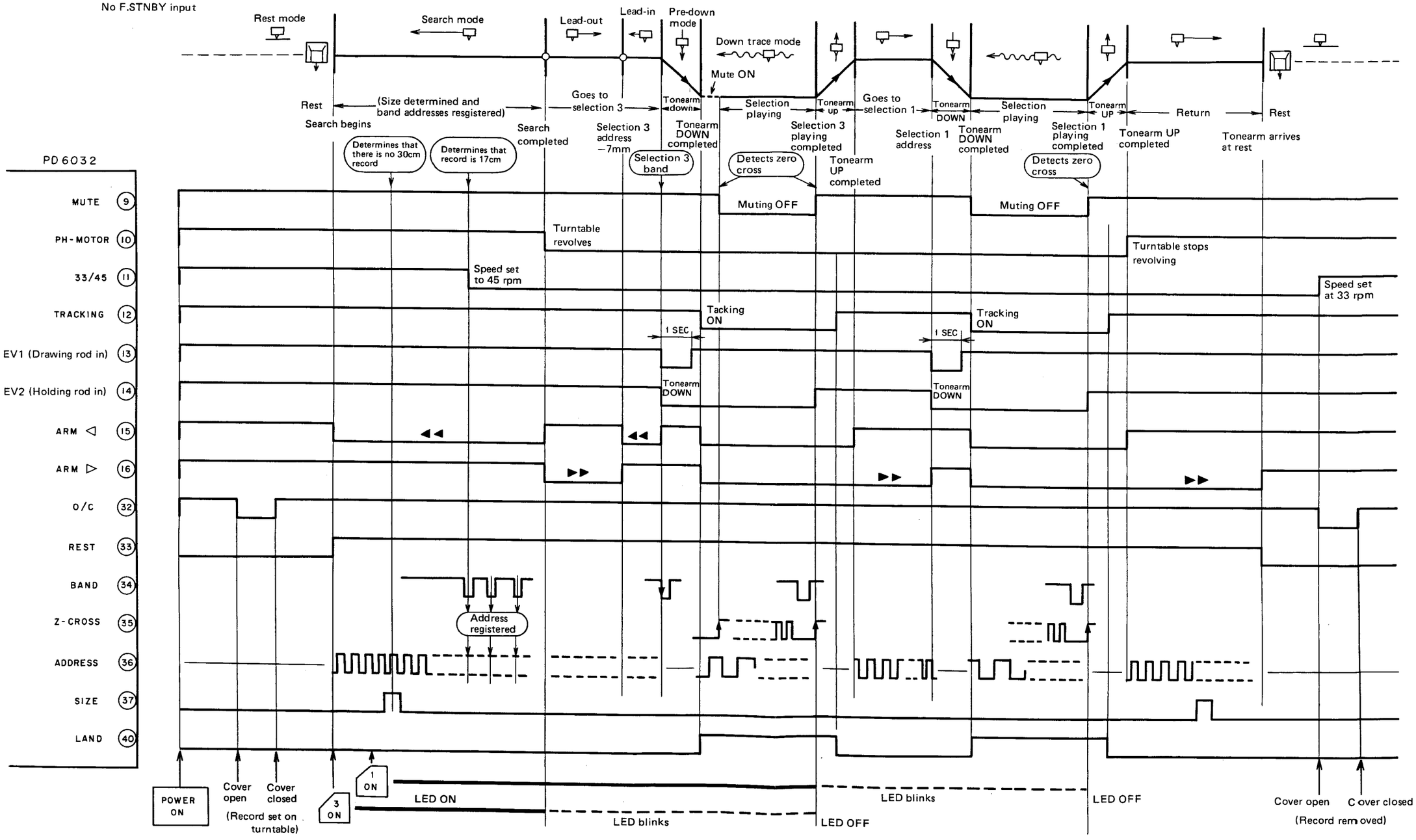


5.6 TIMING CHART

17cm EP record a single cycle of operations performed in going from selection 3 to selction 1

With SPEED SW set to AUTO

No F.STNBY input



6. IC INFORMATION

• PD6032

Pin No.	Symbol	Terminal name	I/O	Function
1	Extal	——	——	Terminal with a built-in clock oscillator to connect with outside circuits
2	Xtal	——	——	(Ceramic oscillator f=3MHz)
3	RESET	——	I	CPU initial reset input (normally H)
4	IRQ	F•STBY	I	Auto fader, standby input
5	SO	Not in use		
6	SI	Not in use		
7		Not in use		
8		Not in use		
9	P0	MUTE	O	Muting ON/OFF (Deck synchronizer output)
10	P1	PH-MOTOR	O	Phono motor start/stop output
11	P2	33/45	O	Phono motor 33/45 switch output
12	P3	TRAKING	O	Tonearm tracking during tracing
13	O1	EV1 (drawing rod in)	O	Tonearm elevation drive output (drawing rod in) drawing time 1 second
14	O1	EV2 (holding rod in)	O	Tonearm elevation drive output (holding rod in)
15	O2	ARM ◀	O	Tonearm motor drive output (movement toward center of record)
16	O3	ARM ▶	O	Tonearm motor drive output (movement toward outside edge of record)
17	O4	LED	O	LED matrix output
18	O5	LED	O	LED matrix output
19	O6	LED	O	LED matrix output
20	O7	Not in use		
21	VSS	——	——	GND
22	R0	Digit	O	KEY LED matrix output
23	R1	Digit	O	KEY LED matrix output
24	R2	Digit	O	KEY LED matrix output
25	R3	Digit	O	KEY LED matrix output
26	R4	Key in	I	KEY matrix input
27	R5	Key in	I	KEY matrix input
28	R6	Key in	I	KEY matrix input
29	R7	Key in	I	KEY matrix input
30	R8	45rpm	I	33/45 speed switch 45 input
31	R9	33rpm	I	33/45 speed switch 33 input
32	R10	O/C	I	Cover open/closed detection switch input
33	R11	REST	I	Rest switch input
34	R12	BAND	I	Band sensor band input
35	R13	Z-Cross	I	Band sensor zero cross input
36	R14	Address	I	Address sensor input
37	R15	SIZE	I	30cm record size detection input
38	K0	Not in use		
39	K1	Not in use		
40	K2	LAND	I	Tonearm down complete detection input
41	K3	F • I/O	I	Auto fader, DOWN, SKIP input
42	Vcc	——	——	+5V

7. DISASSEMBLY

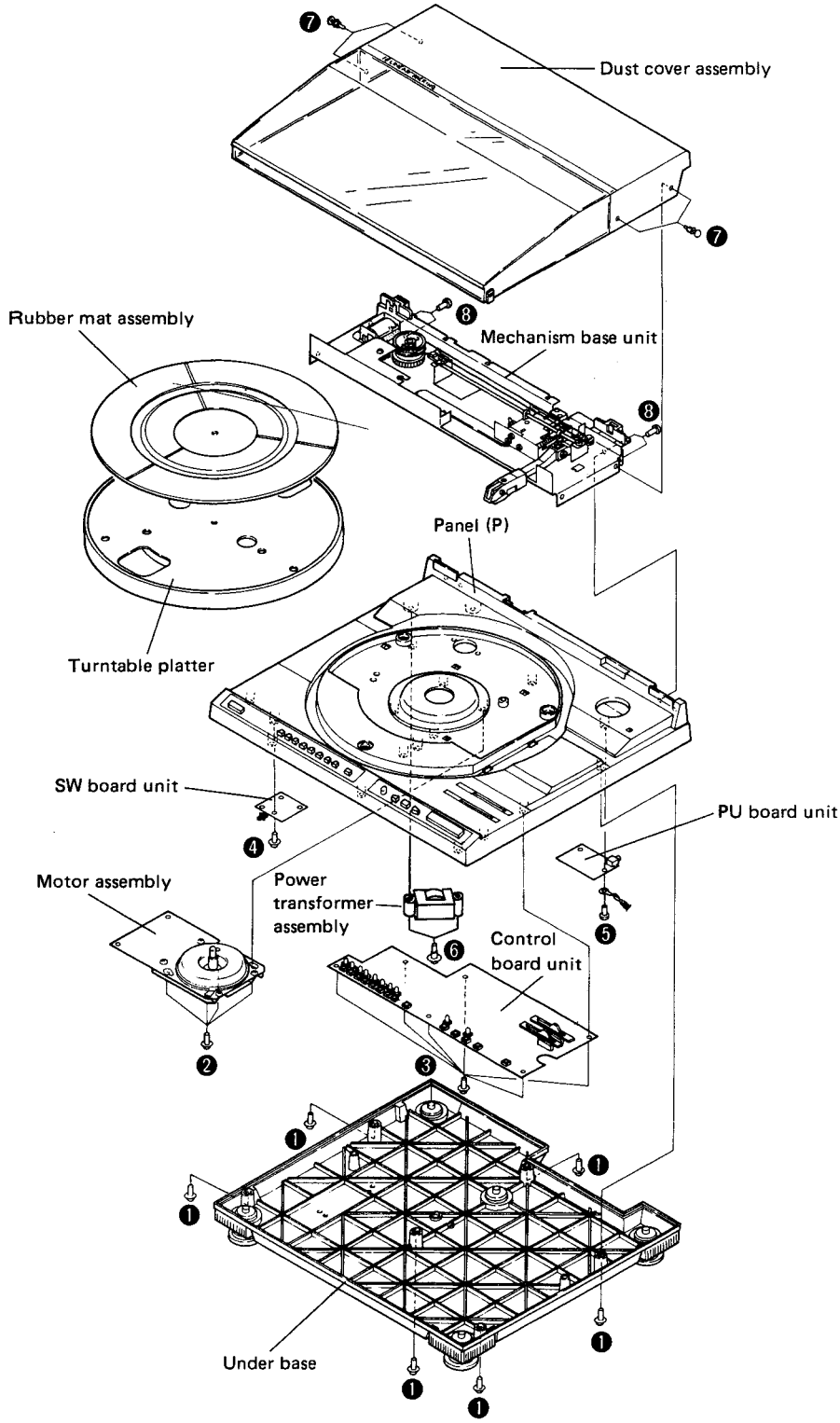


Fig. 7-1 Disassembly

7.1 UNIT DISASSEMBLY

1. Open the dust cover and remove the rubber sheet and turntable.
2. Close the dust cover and gently turn the unit over. Place the unit on something soft that won't scratch the dust cover.
3. Removing screw ❶ releases the under base.
4. Removing screw ❷ releases the motor assembly.
5. Removing screw ❸ releases the control board unit.
6. Removing screw ❹ releases the switch base board unit, and removing screw ❺ releases the PU base board unit.
7. Removing screw ❻ releases the power transformer assembly.
8. To remove the dust cover, open it up and remove the plastic rivets labeled ❼ . (The plastic rivets can be removed easily by pushing the pins from the inside of the dust cover.)
9. Removing screw ❽ will release the mechanism base unit.

7.2 CARRIAGE REMOVAL

1. Remove the fixer from the carriage and the wire from the pulley. (See Figure 7-2)
2. Remove screw ❾ and pull the guide bar away from the carriage in the direction indicated by the arrow. The carriage and tonearm assembly can now be removed.
3. Removing the spring will release the carriage board assembly, and removing screw ❿ will release the mechanism base board assembly.

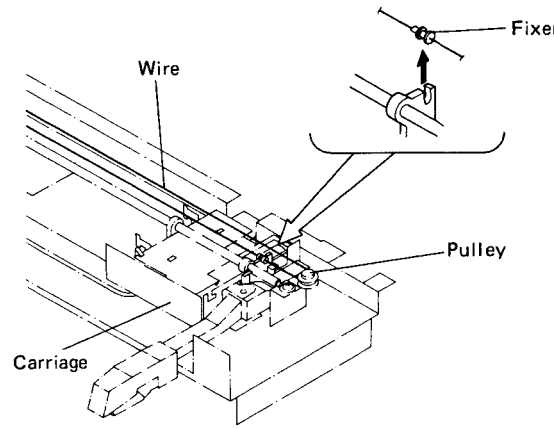


Fig. 7-2 Removing Carriage Wire

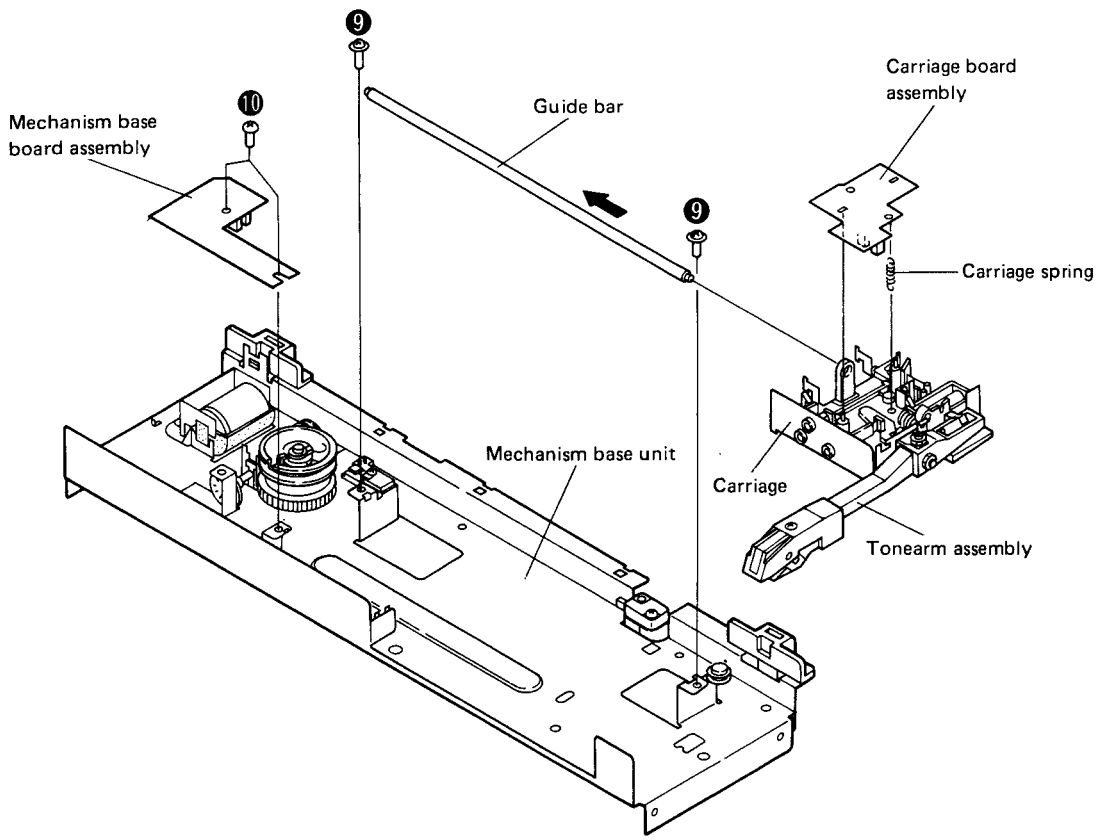


Fig. 7-3 Carriage Removal

7.3 REPLACING THE CARRIAGE WIRE

- After assembling the carriage and tonearm assemblies in the opposite order of the previous section, replace the carriage wire according to the following steps.

1. Adjust the length of the wire unit as shown in figure 7-4 ⓐ.
2. Attach the wire unit grommet to the spring of the worm wheel as shown in figure 7-4 ⓑ. Then wind the wire onto the worm wheel taking care not to let it get caught in the worm wheel groove. Also be careful not to let the wire overlap.
3. Holding both the wire and the worm wheel, connect the wire to the wire guard and attach the worm wheel to the mechanism base.
4. As shown in figure 7-4 ⓒ, put the wire around the pulley, and push the fixer into the carriage until it locks with a click.

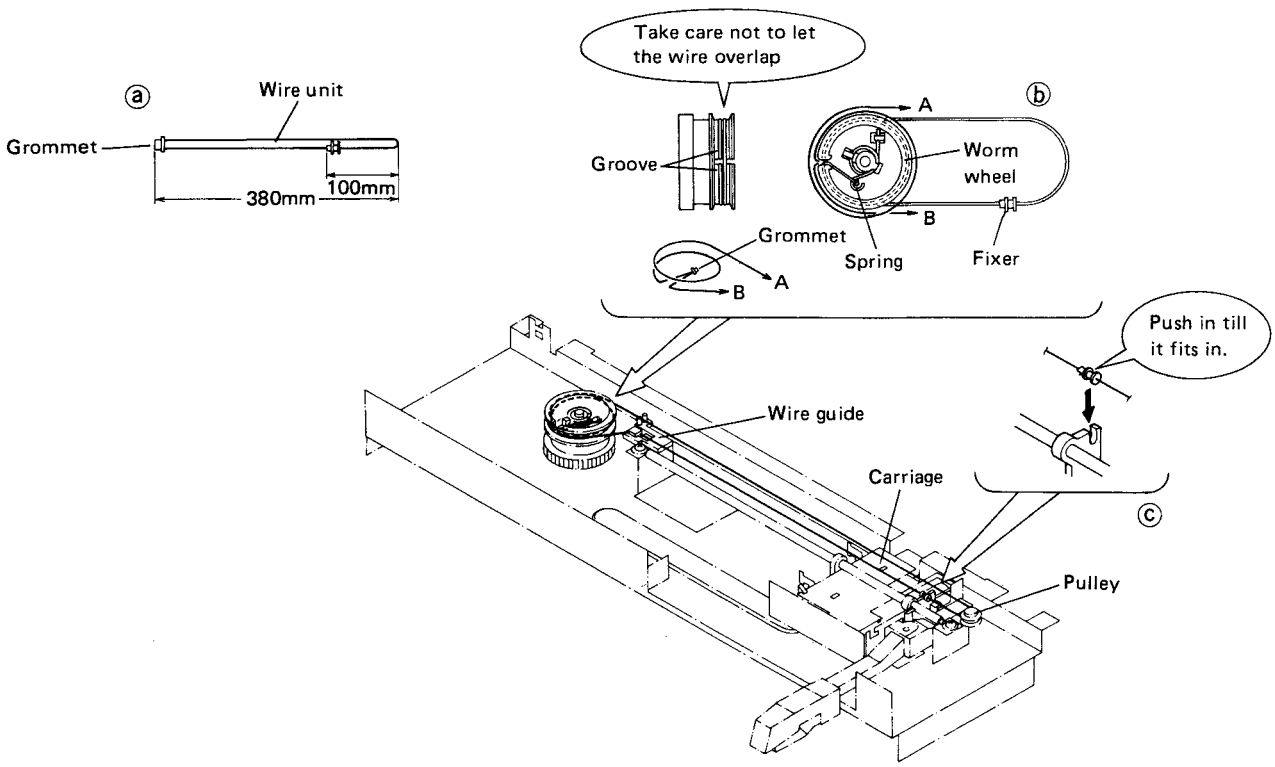


Fig. 7-4 Wire Replacement

7.4 LEAD LINE DISPOSAL

1. Slide carriage to the left as far as it will go.
2. Insert enough lead line to reach from the clamp to the motor holder. (Indicated by arrows) Insert the tickest line last.
3. Move the carriage to the left and right, and check to make sure that the lead lines don't hit the carriage.

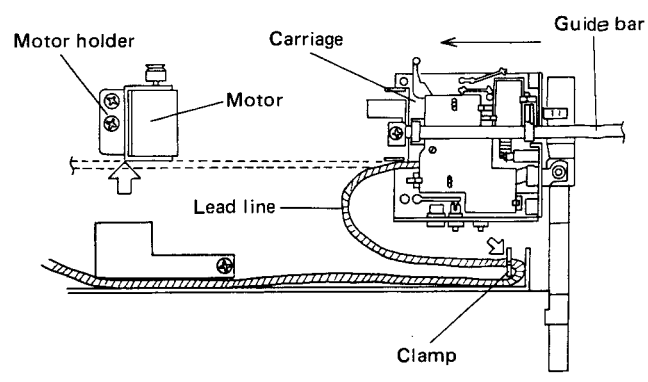


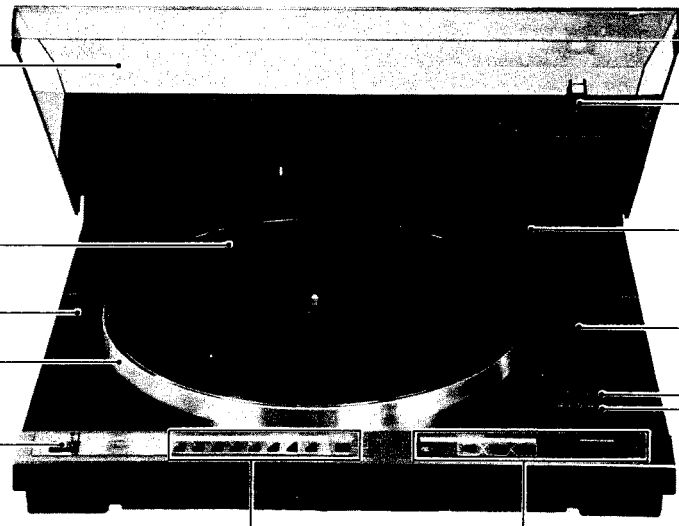
Fig. 7-5 Lead Line Disposal

8. PARTS LOCATIONS

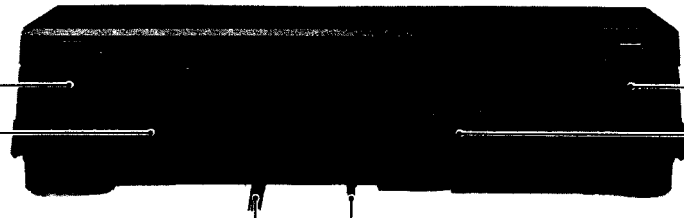
NOTES:

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

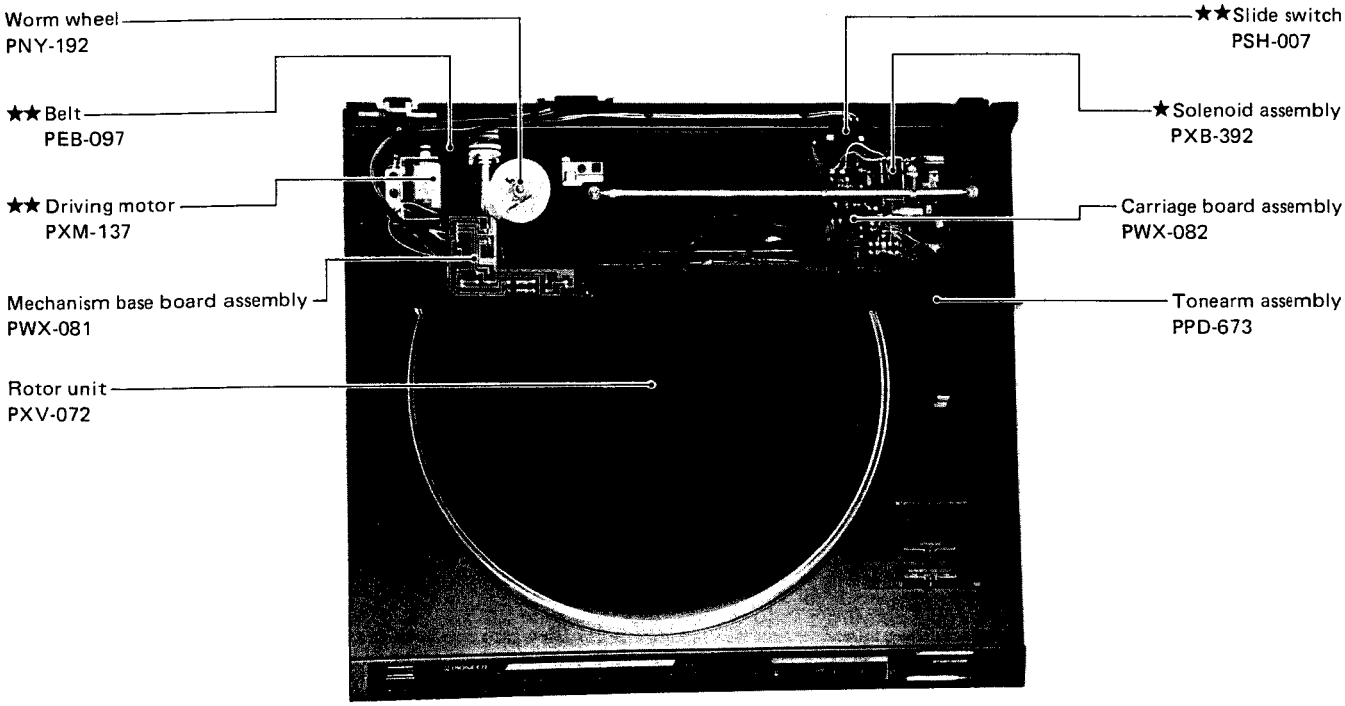
Front Panel View



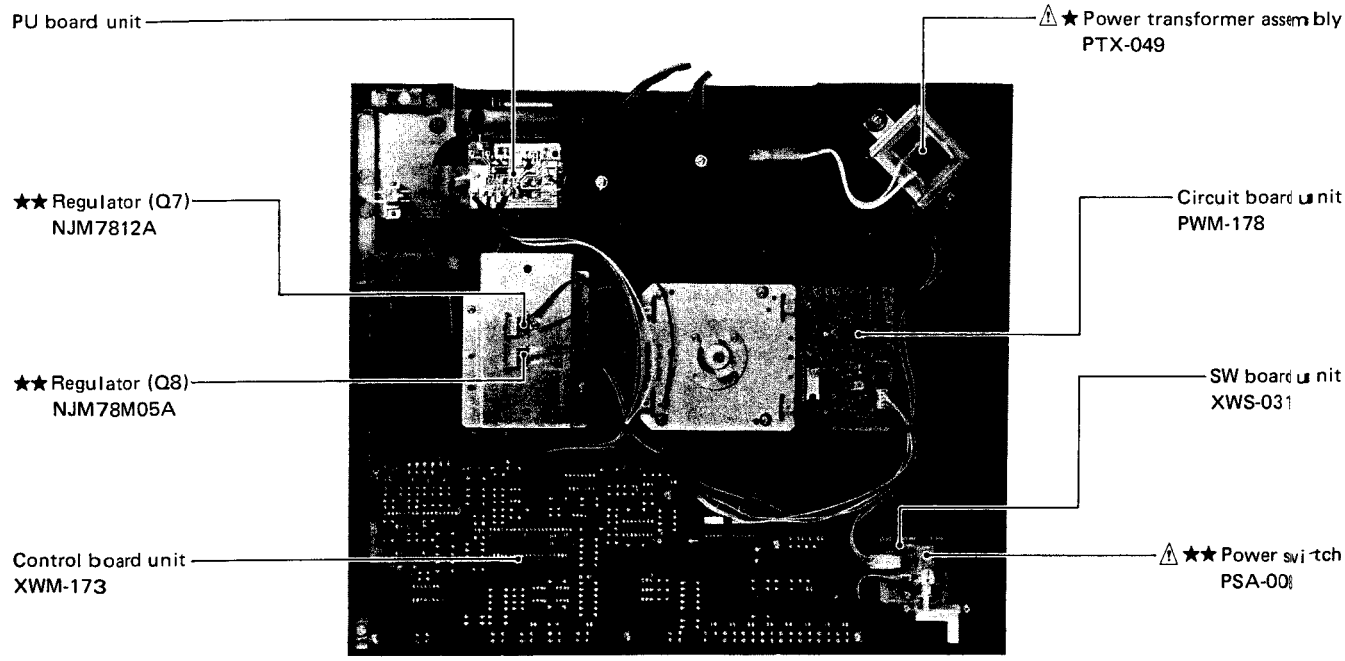
Rear Panel View



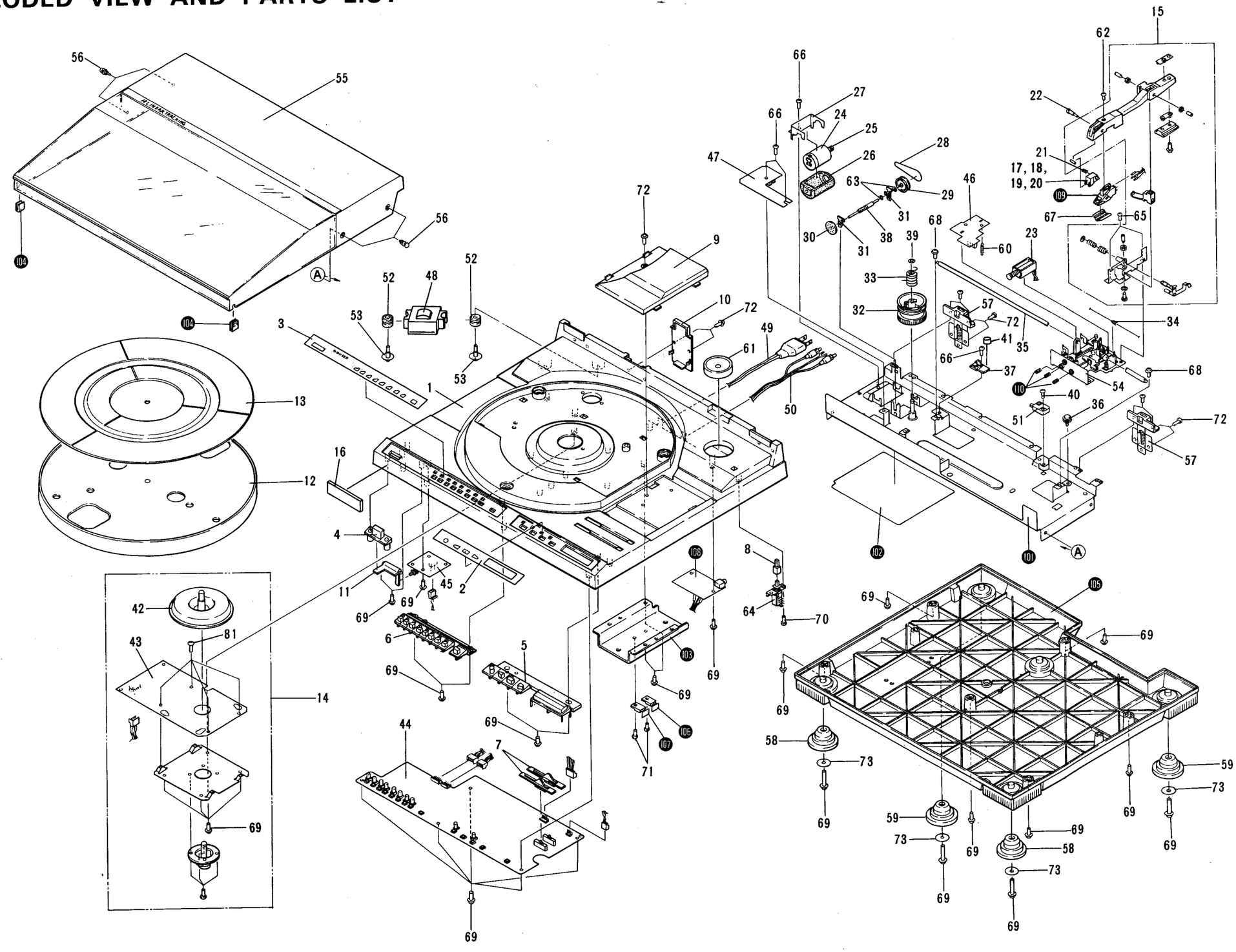
Top View



Bottom View



9. EXPLODED VIEW AND PARTS LIST



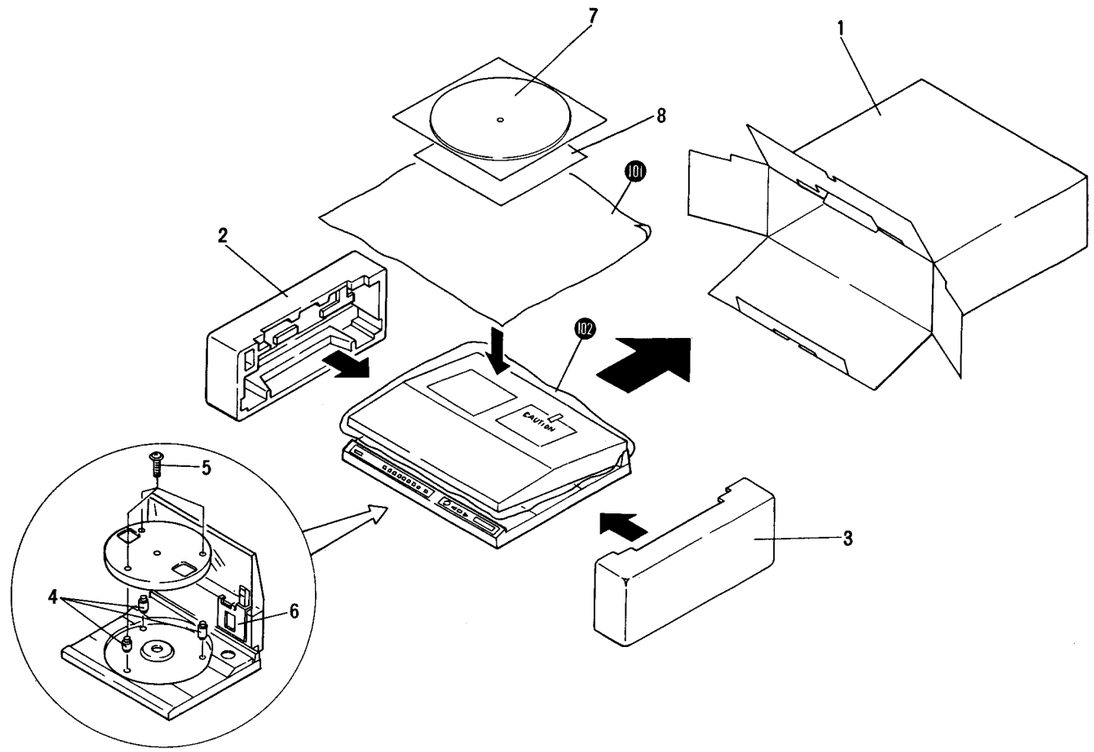
Parts List of Exploded View

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	No.	Part No.	Description
	1.	PNY-241	Panel (P)
	2.	PAM-135	Screen (F)
	3.	PAM-134	Screen (E)
	4.	PAC-201	Power knob (A)
	5.	PAC-202	Function knob (A)
	6.	PAC-203	Select knob
	7.	PAC-215	Slide knob (SPEED, SENSOR)
	8.	PNY-184	Switch cap
	9.	PNY-185	Panel cover
	10.	PNY-186	Cover
	11.	PNY-187	Switch lever
	12.	PNR-199	Turntable platter
	13.	PEA-073	Rubber mat assembly
★★	14.	PXM-145	Motor
	15.	PPD-673	Tonearm assembly
	16.	PAT-048	Name plate
	17.	PNY-199	Sensor case
	18.	PNP-309	Band sensor board
★	19.	PCX-059	Ph Tr
★	20.	NJL1102EH	LED
	21.	PBH-389	Spring
	22.	PLB-234	Screw
★	23.	PXB-392	Solenoid assembly
★★	24.	PXM-137	Driving motor
★★	25.	PNX-498	Motor pulley
	26.	PEB-268	Damper rubber
	27.	PNC-325	Motor holder
★★	28.	PEB-097	Belt
	29.	PNY-190	Pulley
	30.	PNY-191	Slit plate
	31.	PNW-391	Collar
	32.	PNY-192	Worm wheel
	33.	PBH-391	Spring
	34.	PLB-237	Fixer
	35.	PLB-256	Guide bar
	36.	PXB-393	Pulley assembly
	37.	PNY-196	Wire guide
	38.	PNW-485	Worm unit
	39.	PBF-021	Washer
	40.	PBA-138	Screw
	41.	PEB-285	Rubber cap
★★	42.	PXV-104	Rotor unit
	43.	PWM-178	Circuit board unit
⚠	44.	XWM-173	Control board unit
⚠	45.	XWS-031	SW board unit
	46.	PWX-082	Carriage board assembly
	47.	PWX-081	Mechanism base board assembly
⚠	★ 48.	PTX-049	Power transformer assembly (120V)
⚠	49.	PDF-221	Power cord assembly
	50.	PDX-016	PU cord assembly
★★	51.	PSH-007	Slide switch
	52.	PEB-267	Base rubber
	53.	PBA-173	Screw
	54.	PNY-273	Carriage
★★	55.	PXB-394	Dust cover assembly
	56.	PBM-012	Plastic rivet
★	57.	PXB-395	Hinge assembly
	58.	PEB-269	Insulator (A)
	59.	PEB-270	Insulator (B)
	60.	PBH-406	Carriage spring
	61.	N93-603	EP adaptor
	62.	PMZ30P060FZK	Screw
	63.	WA21D040D025	Washer
	64.	PSG-058	Push switch (O/C switch)
	65.	PSZ30P050FMC	Screw
	66.	PSZ30P060FZK	Screw
	67.	PNX-981	Stylus cover
	68.	iSZ30P060FMC	Screw
	69.	iPZ30P080FMC	Screw
	70.	PPZ30P080FMC	Screw
	71.	PSZ30P060FMC	Screw
	72.	iPZ30P080FZK	Screw
	73.	WA40F160M080	Washer
	101.		Mechanism base unit
	102.		Base sheet (P)
	103.		Heat sink
	104.		Rubber foot
	105.		Under base
	106.		Tr board (A) unit
	107.		Tr board (B) unit
	108.		PU board unit
	109.		Cartridge assembly
	110.		Screw

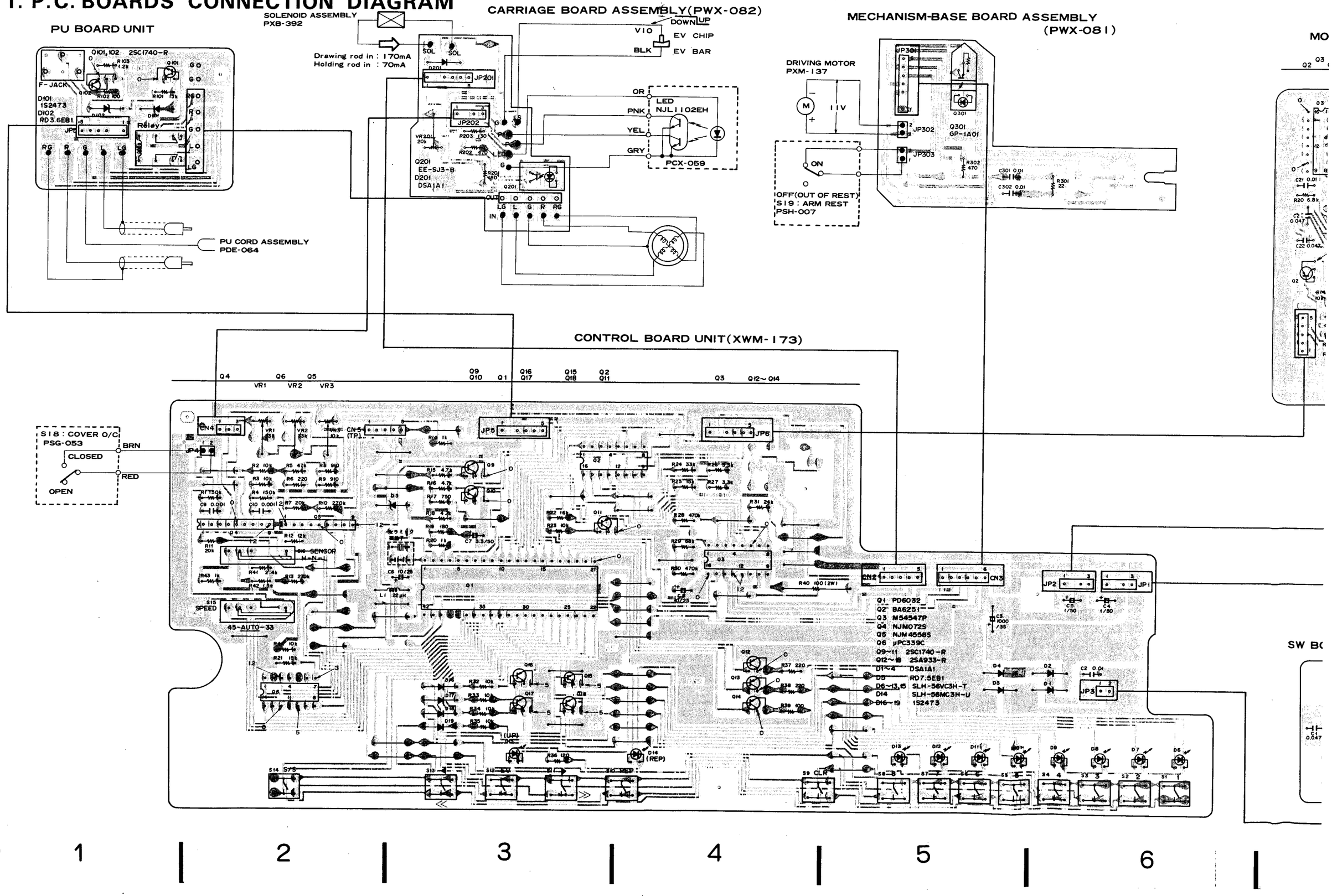
10. PACKING



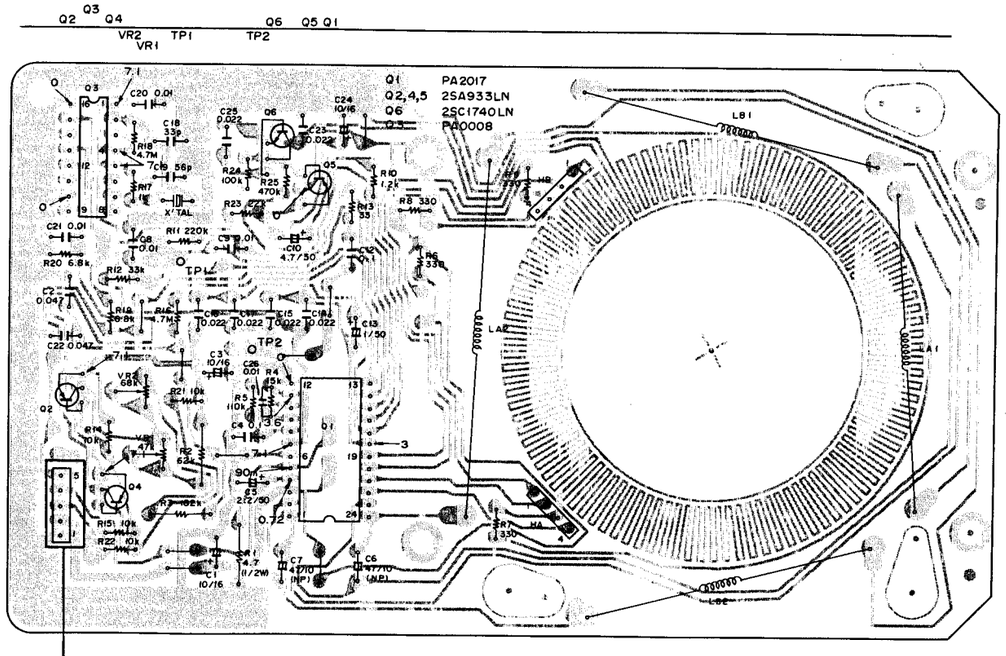
Parts List of Packing

Mark	No.	Part No.	Description
	1.	PHH-183	Packing case
	2.	PHA-178	Protector (L)
	3.	PHA-179	Protector (R)
	4.	PNY-198	Packing
	5.	PBA-178	Screw
	6.	PNY-194	Carriage clamper
	7.	PEA-073	Bubber mat assembly
	8.	PRB-274	Operating instructions
	101		Sheet
	102		Sheet

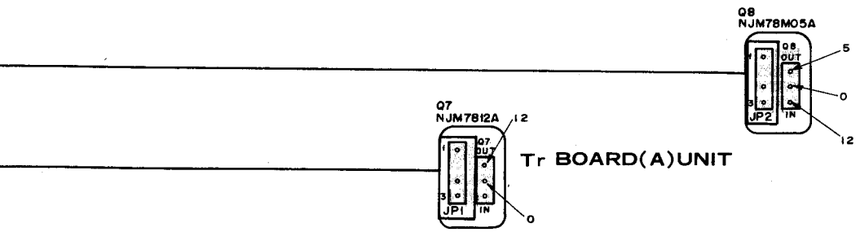
11. P.C. BOARDS CONNECTION DIAGRAM



MOTOR (PXM-145)

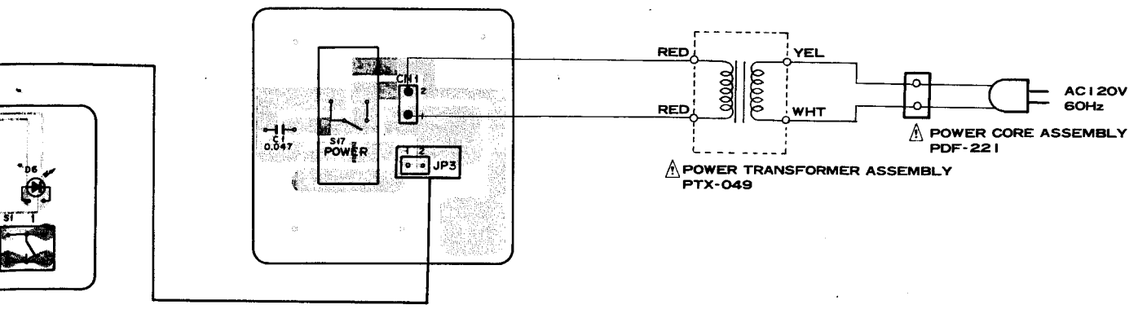


Tr BOARD(B)UNIT



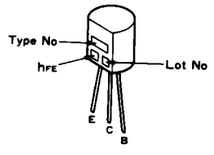
Tr BOARD(A)UNIT

SW BOARD UNIT (XWS-031)

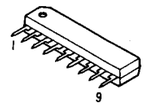


External Appearance of Transistors and ICs

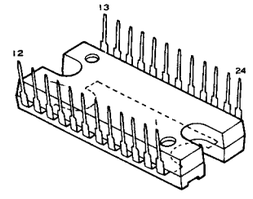
2SA933
2SC1740



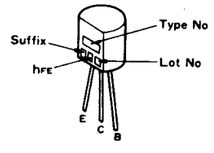
NJM4558S
NJM072S



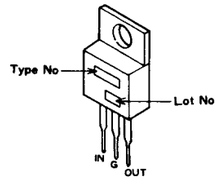
PA2017



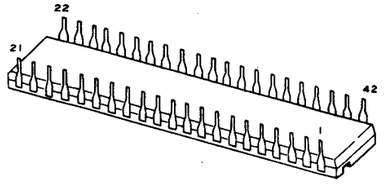
2SA933LN
2SC1740LN



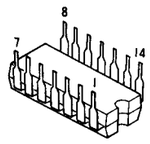
NJM78M05A
NJM7812A



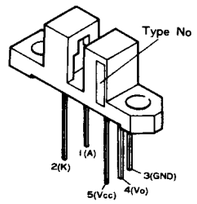
PD6032



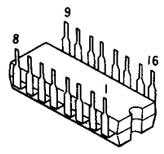
μPC339C



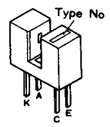
GP-1A01

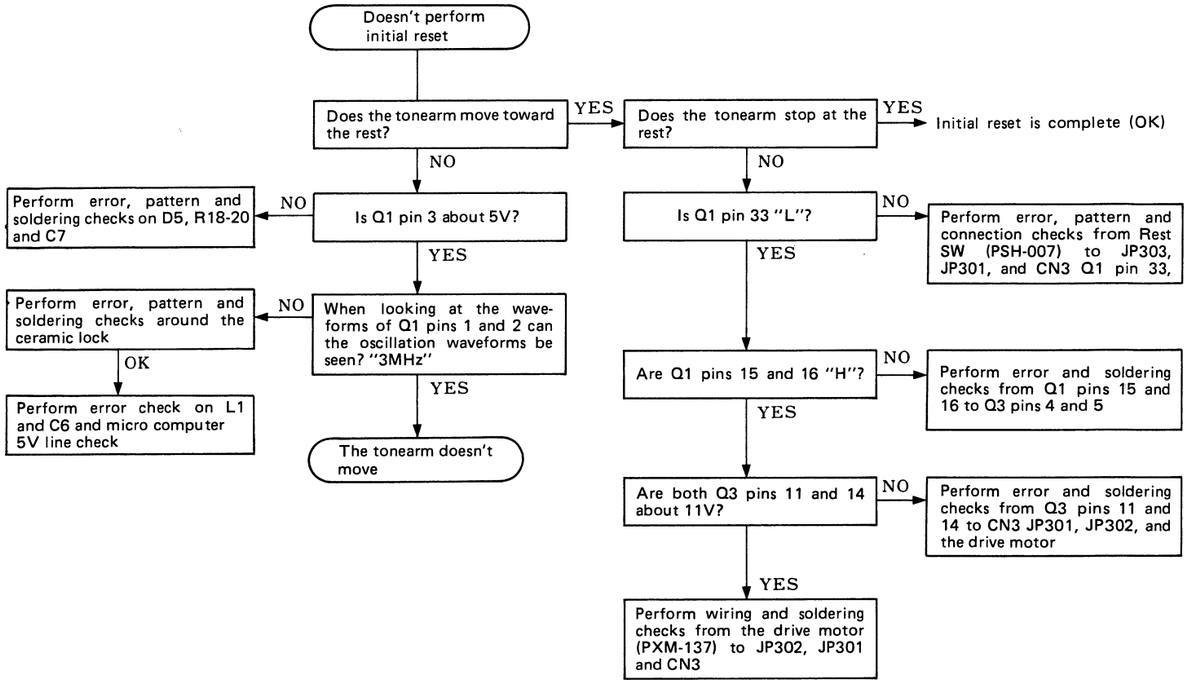


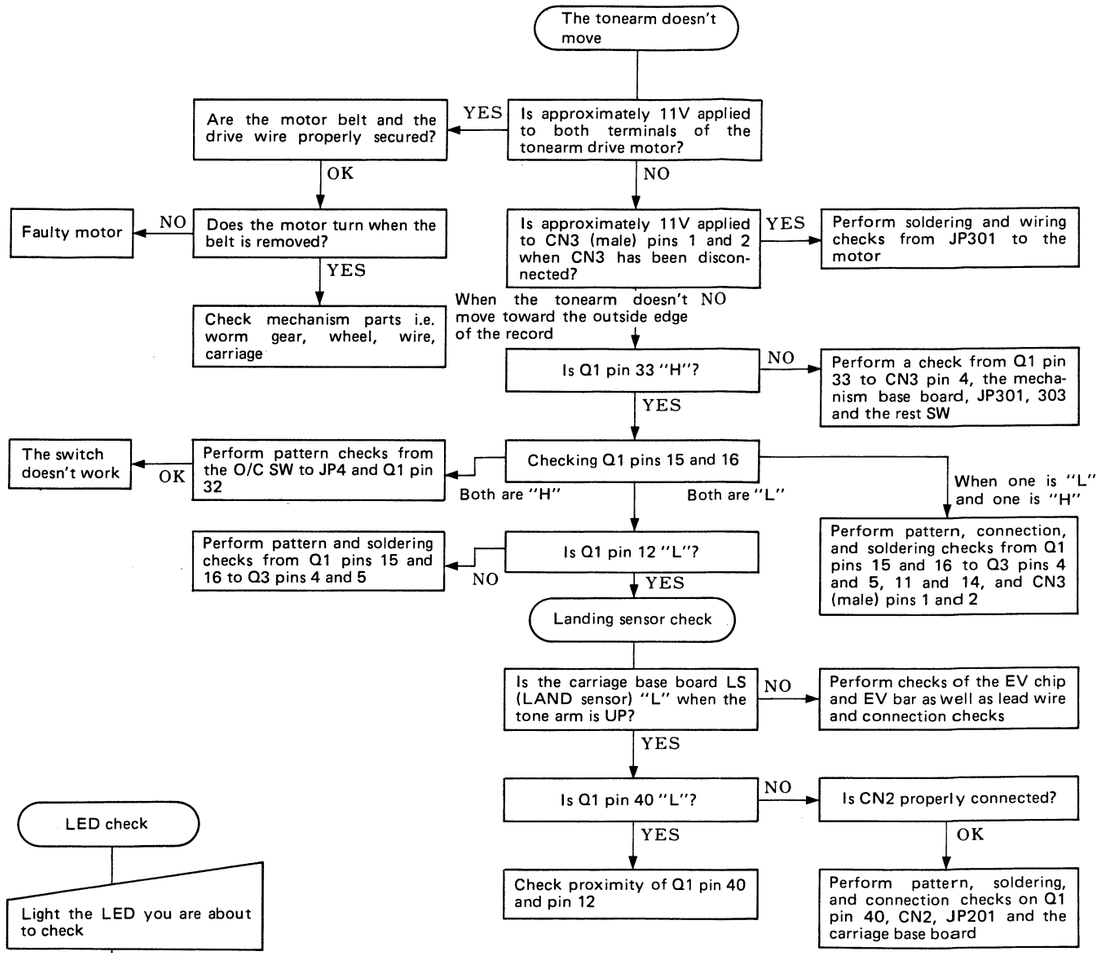
BA6251
M54547P
PD0008
PD1007

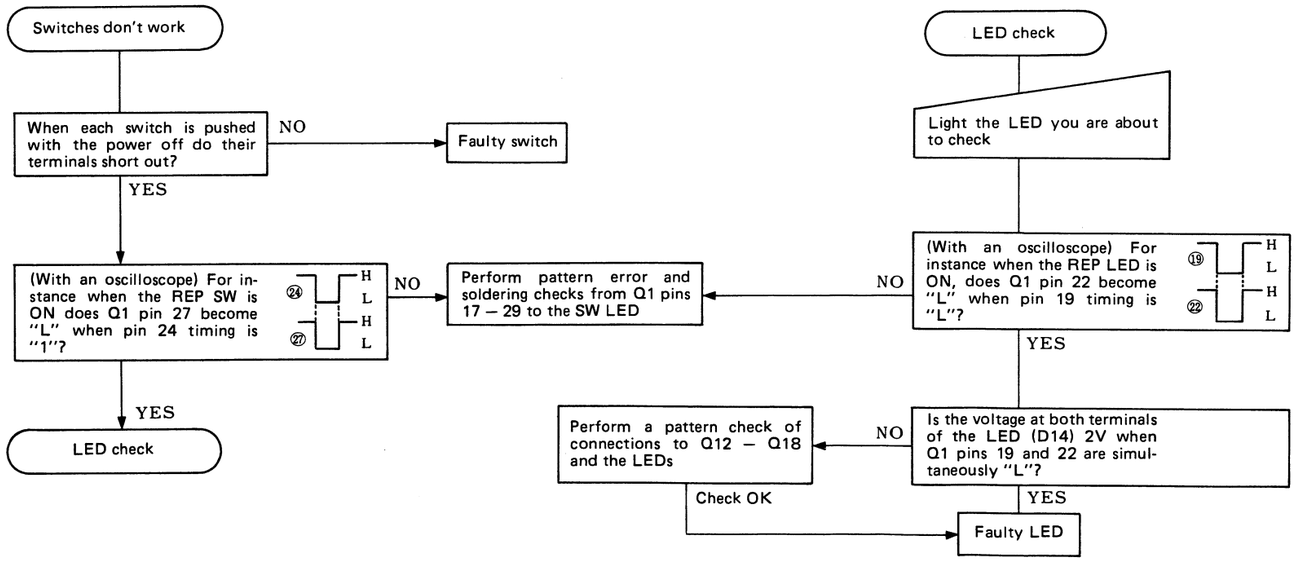


EE-SJ3-B

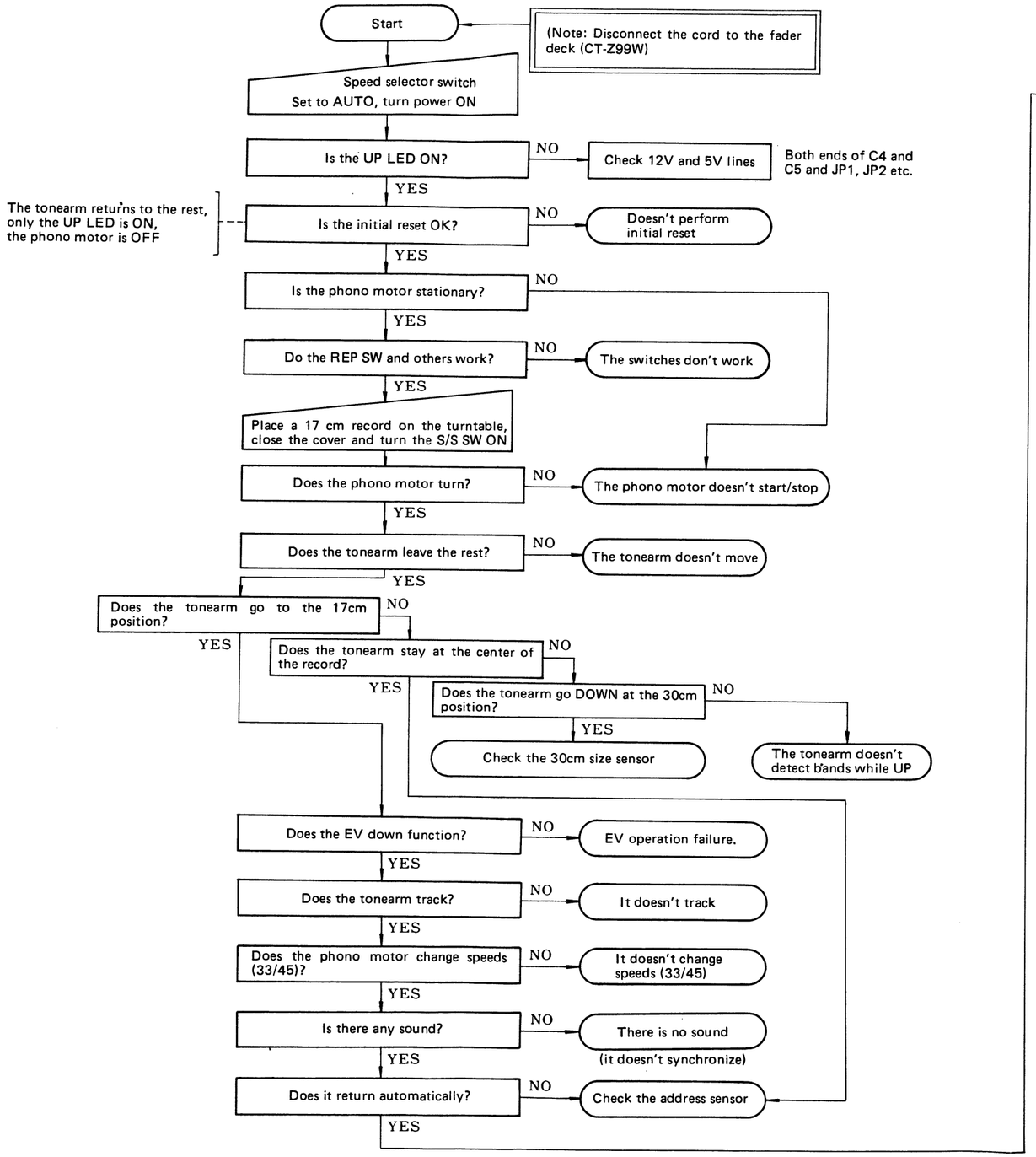


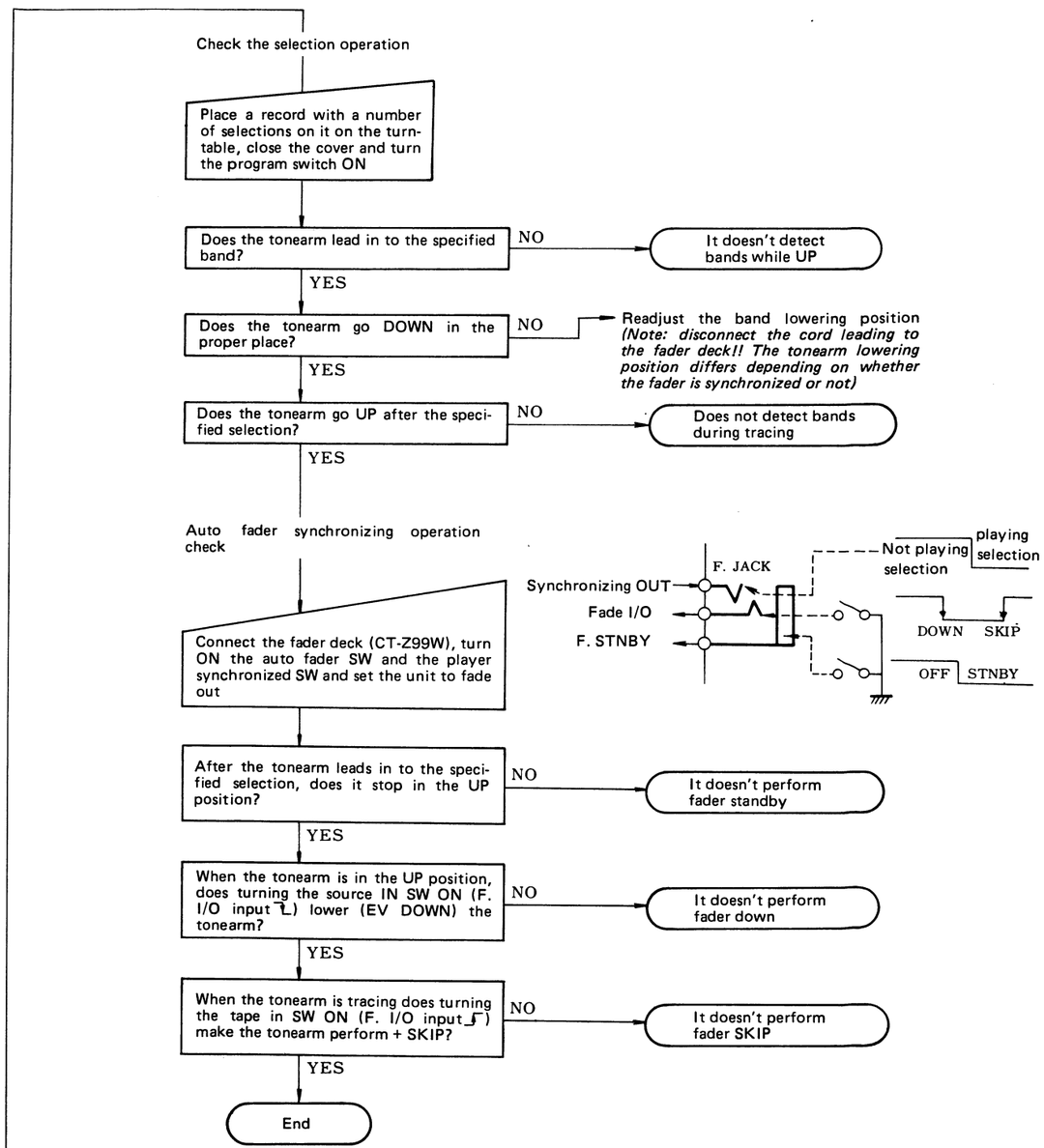

Doesn't perform initial reset
Does the tonearm move toward the rest?
YES
NO
Does the tonearm stop at the rest?
YES
Initial reset is complete (OK)
NO
Perform error, pattern and soldering checks on D5, R18-20 and C7
NO
Is Q1 pin 3 about 5V?
YES
Is Q1 pin 33 "L"?
NO
Perform error, pattern and connection checks from Rest SW (PSH-007) to JP303, JP301, and CN3 Q1 pin 33,
YES
Perform error, pattern and soldering checks around the ceramic lock
NO
When looking at the waveforms of Q1 pins 1 and 2 can the oscillation waveforms be seen? "3MHz"
YES
Are Q1 pins 15 and 16 "H"?
NO
Perform error and soldering checks from Q1 pins 15 and 16 to Q3 pins 4 and 5
YES
OK
Perform error check on L1 and C6 and micro computer 5V line check
The tonearm doesn't move
Are both Q3 pins 11 and 14 about 11V?
NO
Perform error and soldering checks from Q3 pins 11 and 14 to CN3 JP301, JP302, and the drive motor
YES
Perform wiring and soldering checks from the drive motor (PXM-137) to JP302, JP301 and CN3


The tonearm doesn't move
Is approximately 11V applied to both terminals of the tonearm drive motor?
YES
Are the motor belt and the drive wire properly secured?
OK
Faulty motor
NO
Does the motor turn when the belt is removed?
YES
Check mechanism parts i.e. worm gear, wheel, wire, carriage
NO
Is approximately 11V applied to CN3 (male) pins 1 and 2 when CN3 has been disconnected?
YES
Perform soldering and wiring checks from JP301 to the motor
When the tonearm doesn't move toward the outside edge
NO
Is Q1 pin 33 "H"?
NO
Perform a check from Q1 pin 33 to CN3 pin 4, the mechanism base board, JP301, 303 and the rest SW
YES
Checking Q1 pins 15 and 16
Both are "H"
Both are "L"
When one is "L" and one is "H"
Perform pattern, connection, and soldering checks from Q1 pins 15 and 16 to Q3 pins 4 and 5, 11 and 14, and CN3 (male) pins 1 and 2
Is Q1 pin 12 "L"?
NO
YES
Perform pattern and soldering checks from Q1 pins 15 and 16 to Q3 pins 4 and 5
Landing sensor check
Is the carriage base board LS (LAND sensor) "L" when the tone arm is UP?
NO
Perform checks of the EV chip and EV bar as well as lead wire and connection checks
YES
Is Q1 pin 40 "L"?
NO
Is CN2 properly connected?
YES
OK
Check proximity of Q1 pin 40 and pin 12
Perform pattern, soldering, and connection checks on Q1 pin 40, CN2, JP201 and the carriage base board
The switch doesn't work
OK
Perform pattern checks from the O/C SW to JP4 and Q1 pin 32


Switches don't work
When each switch is pushed with the power off do their terminals short out?
NO
Faulty switch
YES
(With an oscilloscope) For instance when the REP SW is ON does Q1 pin 27 become "L" when pin 24 timing is "1"?
24
27
H
L
H
L
NO
Perform pattern error and soldering checks from Q1 pins 17 – 29 to the SW LED
YES
LED check
LED check
Light the LED you are about to check
(With an oscilloscope) For instance when the REP LED is ON, does Q1 pin 22 become "L" when pin 19 timing is "L"?
19
22
H
L
H
L
NO
YES
Is the voltage at both terminals of the LED (D14) 2V when Q1 pins 19 and 22 are simultaneously "L"?
NO
Perform a pattern check of connections to Q12 – Q18 and the LEDs
Check OK
YES
Faulty LED

15. TROUBLESHOOTING




Check the selection operation
Place a record with a number of selections on it on the turntable, close the cover and turn the program switch ON
Does the tonearm lead in to the specified band?
NO
It doesn't detect bands while UP
YES
Does the tonearm go DOWN in the proper place?
NO
Readjust the band lowering position (Note: disconnect the cord leading to the fader deck!! The tonearm lowering position differs depending on whether the fader is synchronized or not)
YES
Does the tonearm go UP after the specified selection?
NO
Does not detect bands during tracing
YES
Auto fader synchronizing operation check
Connect the fader deck (CT-Z99W), turn ON the auto fader SW and the player synchronized SW and set the unit to fade out
Synchronizing OUT
Fade I/O
F. STNBY
F. JACK
Not playing selection
playing selection
DOWN
SKIP
OFF
STNBY
After the tonearm leads in to the specified selection, does it stop in the UP position?
NO
It doesn't perform fader standby
YES
When the tonearm is in the UP position, does turning the source IN SW ON (F. I/O input L) lower (EV DOWN) the tonearm?
NO
It doesn't perform fader down
YES
When the tonearm is tracing does turning the tape in SW ON (F. I/O input ⌐) make the tonearm perform + SKIP?
NO
It doesn't perform fader SKIP
YES
End

13. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561 .....*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473 .....*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5 .....*		*RN2H 0 R 5 K*
1Ω	*010 .....*		*RS1P 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621 ....*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Parts

Mark	Symbol & Description	Part No.
⚠	Control board unit	XWM-173
	Tr board (A) unit	
	Tr board (B) unit	
⚠	SW board unit	XWS-031
	PU board unit	
	Carriage board assembly	PWX-082
	Mechanism base board assembly	PWX-081
	Motor assembly	PXM-134
	Circuit board unit	PWM-178
★	Ph Tr	PCX-059
★	LED	NJL1102EH
★★	Driving motor	PXM-137
⚠ ★	T1 Power transformer assembly (120V)	PTX-049

Control Board Unit (XWM-173)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q1	PD6032
★★	Q2	BA6251
★★	Q3	M54547P
★★	Q4	NJM072S
★★	Q5	NJM4558S
★★	Q6	μPC339C
★★	Q9 – Q11	2SC1740
★★	Q12 – Q18	2SA933
⚠ ★	D1 – D4	DSA1A1 (DSA1A2)
★	D5	RD7.5EB1 (RD7.5EB2)
★	D16 – D19	1S2473
★	D6 – D13, D15	SLH-56VC3H-T
★	D14	SLH-56MC3H-U

SWITCHES AND OTHERS

Mark	Symbol & Description	Part No.
★★	S1 – S14 Tact switch	PSG-052
★★	S15 Slide switch	PSH-010
	Push switch	PSG-053
	L1	LAL03T220K
	Ceramic OSC	CSA3.00MG
	Temperature compensating capacitor	CSC300K

CAPACITORS

Mark	Symbol & Description	Part No.
	C2	CKDYF103Z50
	C3	CEA102M35L
	C4, C5	CEA1R0M50
	C6, C8	CEA100M25
	C7	CEA3R3M50
	C9, C10	CKDYB102K50 (CKDYF102Z50)

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR1, VR2 Semi-fixed (33k-B)	RCP-172
★	VR3 Semi-fixed (10k-B)	RCP-149
⚠	R40	RS2LF101J
	Other resistors	RD1/6PM □□□J

Tr Board (A) Unit

Mark	Symbol & Description	Part No.
⚠ ★★	Q7 Regulator	NJM7812A

Tr Board (B) Unit

Mark	Symbol & Description	Part No.
⚠ ★★	Q8 Regulator	NJM78M05A

SW Board Unit (XWS-031)

Mark	Symbol & Description	Part No.
⚠ ★★	S17 Power switch	PSA-008
	C1	CKDYF473Z50

PU Board Unit

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
⚠ ★★	Q101	2SC1740
★★	Q102	2SC1740
★	D101	1S2473
★	D102	RD3.6EB1 (RD3.6EB2)
	R101 – R103	RD1/6PM □□□J
	RY101 Relay	VSR-005
	Jack	RKN-083

Carriage Board Assembly (PWX-082)

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★★	Q201	EE-SJ3-B
★	D201	DSA1A1 (1SR35-100A)
★	VR201 Semi-fixed (20k-B)	PCP-083
	R201 – R203	RD1/6PM □□□J

Mechanism Base Board Assembly (PWX-081)

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★★	Q301	GP-1A01
	C301, C302	CKDYF103Z50
	R301, R302	RD1/6PM □□□J

Motor Assembly (PXM-145)

Mark	Symbol & Description	Part No.
	Rotor unit	PXV-104
	Circuit board unit	PWM-178

- The motor assembly comprizes the Rotor Unit and the Circuit Board Unit (PWM-178).

Circuit Board Unit (PWM-178)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q1	PA2017
★★	Q2, Q4, Q5	2SA933
★★	Q3	PD0008 (PD1007)
★★	Q6	2SC1740

CAPACITORS

Mark	Symbol & Description	Part No.
	C1, C3, C24	CEA100M16
	C2	CQPA473J50
	C4, C12	CKDYX104M25 (PCL-046)
	C5	CEA2R2M50
	C6, C7	CEANP470M10
	C8, C9	CQMA103K50
	C10	CEA4R7M50
	C13	CEA010M50
	C14 – C17, C23, C25	CKDYF223Z50
	C18	CCDCH330J50
	C19	CCDCH560J50
	C20, C21, C26	CKDYF103Z50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

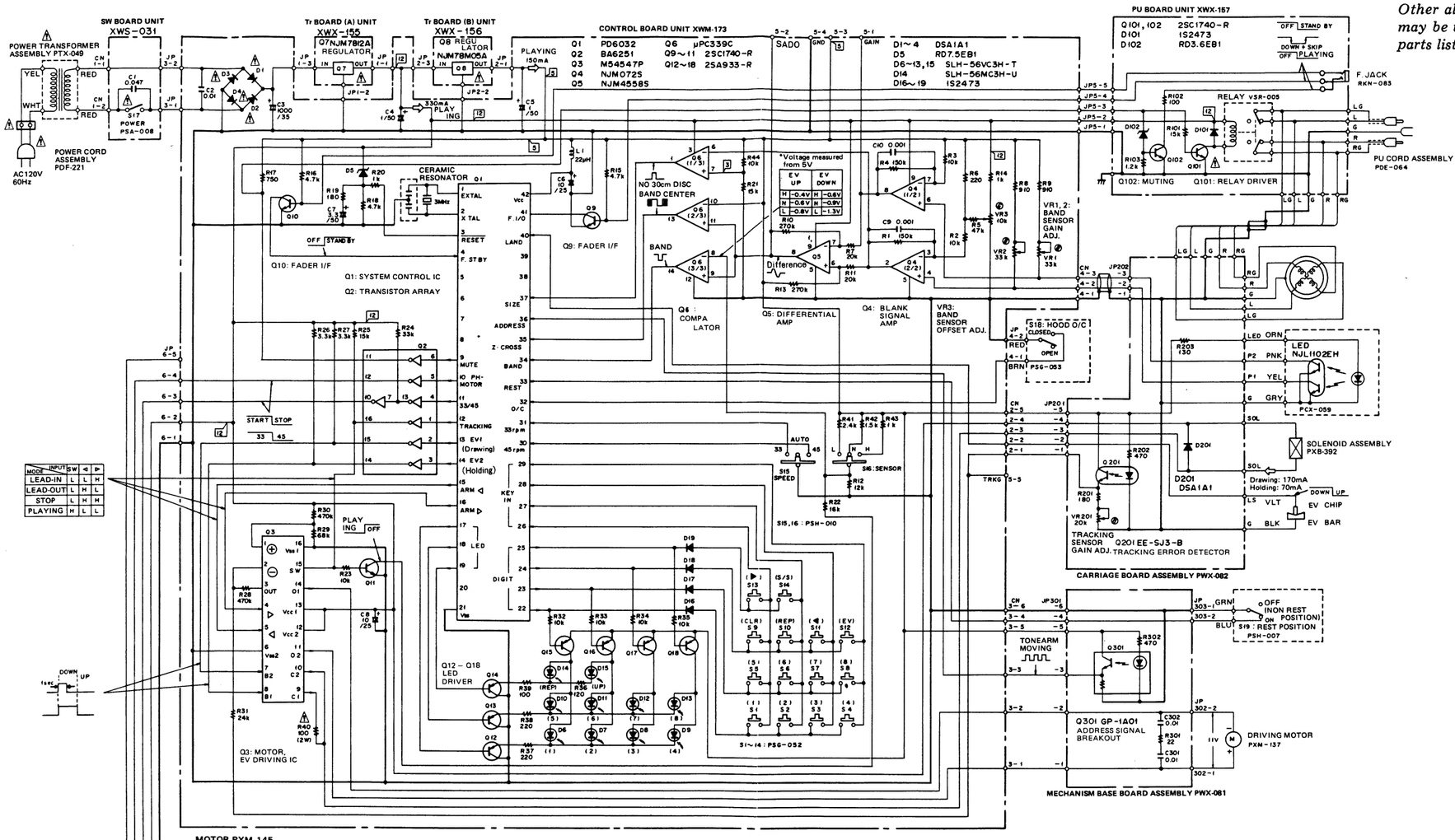
Mark	Symbol & Description	Part No.
★	VR1 Semi-fixed (47k-B)	PCP-085
★	VR2 Semi-fixed (68k-B)	PCP-082
	R1	RD 1/2PM4R7J
	R2, R3	RN 1/4PQ □□□J
	Other resistors	RD 1/6PM □□□J

OTHERS

Mark	Symbol & Description	Part No.
★	Crystal OSC	PSS-003
	HA, HB Hole element H-1	RCX-010 (RCX-012)
	Screw	PSZ30P050FMC

12. SCHEMATIC DIAGRAM

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



1. RESISTORS:
Indicated in Ω, ¼W, ⅛W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M); ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
▭ : DC voltage (V) at no input signal
⇦ mA : DC current at no input signal

4. OTHERS:
➡ : Signal route.
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES:

CONTROL BOARD UNIT		
S1	PROGRAM 1	ON – OFF
S2	PROGRAM 2	ON – OFF
S3	PROGRAM 3	ON – OFF
S4	PROGRAM 4	ON – OFF
S5	PROGRAM 5	ON – OFF
S6	PROGRAM 6	ON – OFF
S7	PROGRAM 7	ON – OFF
S8	PROGRAM 8	ON – OFF
S9	CLEAR	ON – OFF
S10	REPEAT	ON – OFF
S11	SKIP (◀)	ON – OFF
S12	EV	ON – OFF
S13	SKIP (▶)	ON – OFF
S14	START/STOP	ON – OFF
S15	SPEED	33 – AUTO – 45
S16	SENSOR	L – N – H
SW BOARD UNIT		
S17	POWER	ON – OFF
OTHER		
S18	HOOD O/C	CLOSED – OPEN
S19	ARM REST	ON – OFF (NON REST POSITION)

The underlined indicates the switch position.

14. ADJUSTMENT

14.1 TONE ARM ADJUSTMENT

1. With the power ON place a test record (PLS-2001 or PLS-4001 side A up) on the turntable.
2. Press the START/STOP button and check the position of the tone arm as it comes to rest on the record.
3. Lift the dust cover and turn the adjustment screw ❶ until the tone arm comes into line with the record.

- When the tone arm comes to rest to the right of the lead-in groove, (when the count is lower than the standard count tilerance) turn the adjustment screw ❶ counter-clockwise.
- When the tone arm comes to rest to the left of the lead-in groove, (when the count is higher than the standard count tolerance) turn the adjustment screw ❶ clock-wise.
- When using the test record the position will be set for 30cm records.

Test record	Adjustment position
PLS2001 PLS4001	310 ± 3 counts 13 ± 6 counts

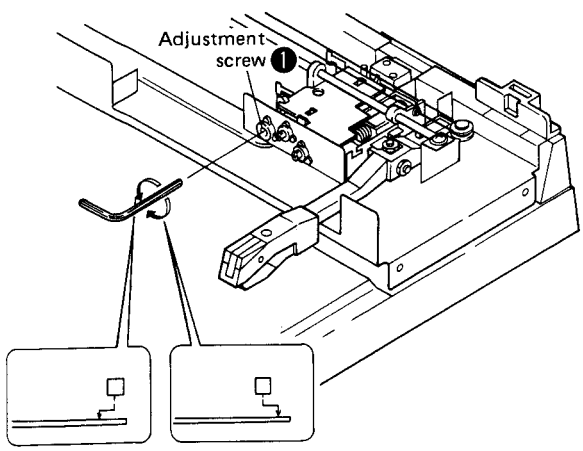


Fig. 14-1 Tone Arm Adjustment

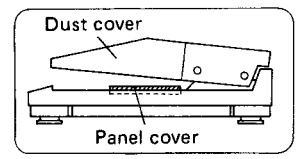
14.2 TRACKING SENSOR GAIN AND OFFSET ADJUSTMENT

• Gain Adjustment

1. Remove the dust cover and panel cover.
2. Connect a DC voltmeter to CN5 pin 4 (GND) and pin 5 (TRKG).
3. Turn screw ❷ counterclockwise and pull the carriage unit forward.
4. Turn on the power and while pushing the tone arm toward the center (as shown in the illustration) adjust VR201 (TRKG) until the DC voltmeter registers 3V ± 0.1V.

• Offset Adjustment

5. Return the tone arm to the rest position. (It will return by itself when you release it.)
6. To adjust it, turn screw ❷ clockwise until the DC volt-meter registers 1.1V ± 0.1V.



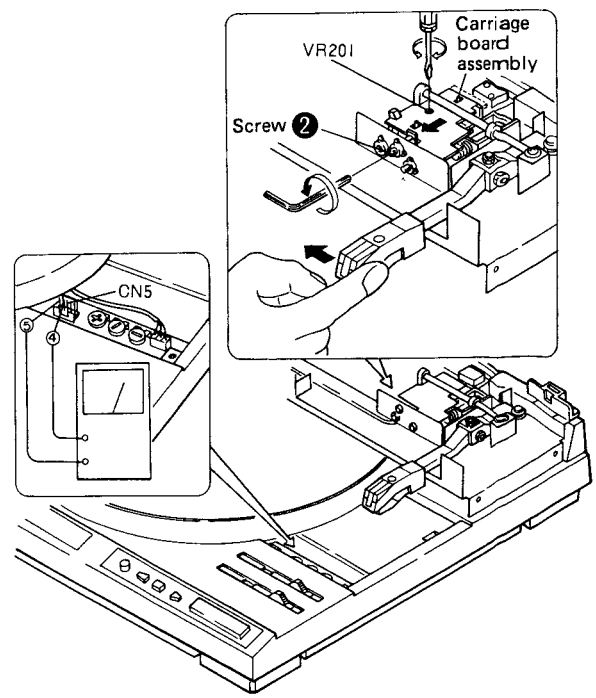


Fig. 14-2 Tracking Sensor Gain and Offset Adjustment

14.3 TONE ARM HEIGHT ADJUSTMENT

1. With the dust cover off, insert two 6mm spacers (one each on the right and left) to make it the same as when the dust cover and mechanism base are connected.
2. Place a 30cm record on the turntable, turn on the power, and using the locate switch (◀◀) move the tone arm to within approximately 100mm of the center of the turntable.
3. Turn screw ❸ until the tip of the needle is 5 to 7 mm above the surface of the record.

- Turning the screw clockwise lowers the needle.
- Turning the screw counterclockwise raises the needle.

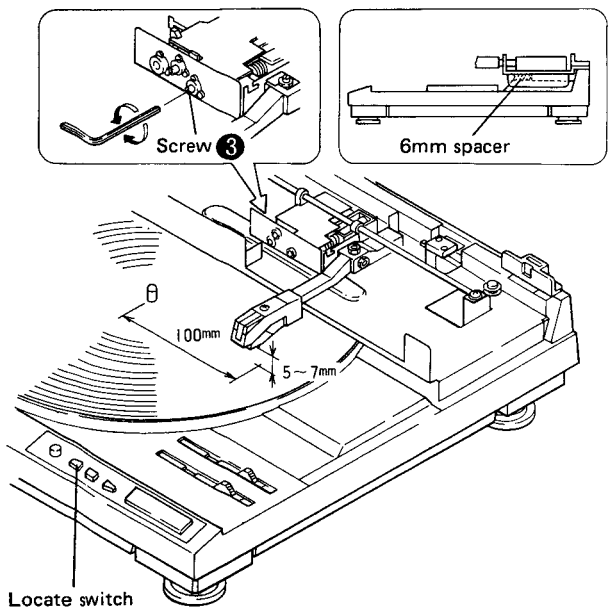


Fig. 14-3 Tone arm height adjustment

14.4 BAND SENSOR OFFSET ADJUSTMENT

- Make this adjustment AFTER making the tone arm height adjustment.

1. With the dust cover off, insert two 6mm spacers (one each on the right and left) to make it the same as when the dust cover and mechanism base are connected.
2. Remove the turntable and the panel cover (black).
3. Replace the turntable, disconnect CN4 and connect a DC voltmeter or an oscilloscope to CN5 pin 2 (SADO) and pin 3 (5V).
4. Turn on the power and turn VR1 (GAIN 1) and VR2 (GAIN 2) counterclockwise until they stop turning.
5. Adjust VR3 (OFSET) until the DC voltmeter or oscilloscope (DC range) measures 0 ± 30mV.

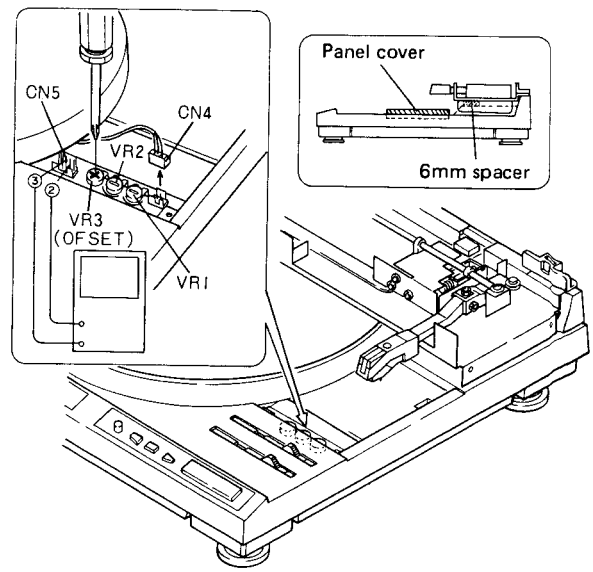


Fig. 14-4 Band Sensor Offset Adjustment

14.5 BAND SENSOR GAIN ADJUSTMENT

- Make this adjustment AFTER making the band sensor offset adjustment.

1. Turn off the power, plug in CN4, and connect an AC voltmeter (valve) to CN5 pin 1 and pin 3.
2. After placing test record PLS-4001 on the turntable side B up (The grooveless side), place the notched rubber gain adjustment sheet (MLB-3199) on top of that.
3. Turn on the power and set the speed to 45rpm. Using the locate switch (◀◀), move the tone arm over the center of the slits in the notched rubber sheet as shown in Fig. 9-5.
4. Adjust VR1 (GAIN 1) until the AC voltmeter (valve) registers 55 ± 3mV.
5. Open the mechanism base (the tone arm will return to the rest position by itself) and remove the notched rubber sheet. Return the tone arm to the same place as before using the locate switch (◀◀).
6. Connect a DC voltmeter or an oscilloscope to pin 2 (SADO) and pin 3 (5V).
7. Adjust VR2 (GAIN 2) until the DC voltmeter or oscilloscope (DC range) registers 0 ± 30mV.

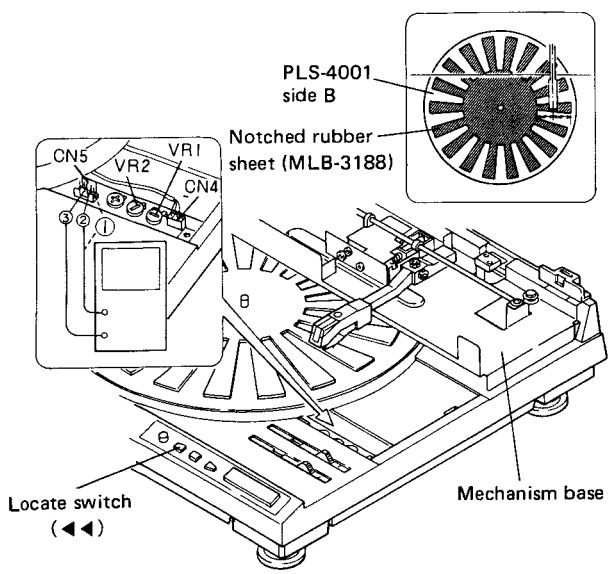


Fig. 14-5 Band Sensor Gain Adjustment.

14.6 PROGRAM SELECTION ADJUSTMENT

- This adjustment is made with both the fader deck (CT-Z99W) series and its connecting cord disconnected.

1. Set the sensor sensitivity switch to "H", and place test record PLS-4001S side A up on the turntable.
2. Set the program switch to selection number 2 and selection number 7.
3. After the needle has come to rest in the band before selection 2, make sure that these is a 3 – 4 second 1 kHz tone. Adjust the tone arm if it doesn't come to rest within the band.
4. To adjust it, push the EV button and raise the tone arm. Turn the adjustment screw until the needle comes to rest within the band.
5. To check that adjustment is correct, bring the tonearm DOWN and press the SKIP (▶▶) switch.

- If the needle comes down in the previous selection (the 1kHz tone is too long) turn the screw counterclockwise.
- If the needle comes down in the previous selection (the 1 kHz tone is too short) turn the screw clockwise.

6. After adjusting the tone arm, push the SKIP button (◀◀) and make sure that there is a 1 kHz signal before selection number 7.

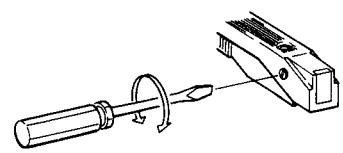


Fig. 14-6 Program Selection Adjustment

14.7 MOTOR OPERATION ADJUSTMENT

1. Remove the underbase.
2. Connect the Ach of a dual trace oscilloscope to the circuit board unit, Q3 (PD0008) pin 15, and GND. Adjust the time axis so that 1 period of the output waveform is equal to 8 divisions in the 33 rpm mode. Figure 14-8 (a).
2. Connect the Bch of a dual trace oscilloscope to Q1 (PA2017) pin 15, and GND. Adjust VR2 (45rpm) so that the relation between the Ach and Bch waveforms in the 45 rpm mode is as shown in figure 14-8 (b).
3. Set the turntable to 33rpm and adjust VR1 (33 rpm) until the relation between the Ach and Bch waveforms are as shown in figure 14-8 (c).
4. Always make motor operation adjustments starting with 45 rpm and ending with 33 rpm.

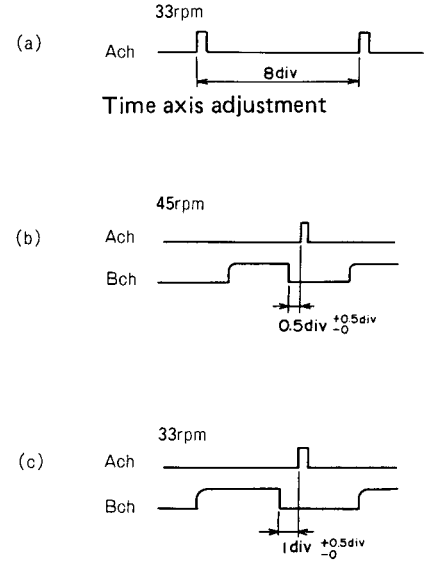


Fig. 14-8 Motor Operation Adjustment Waveforms

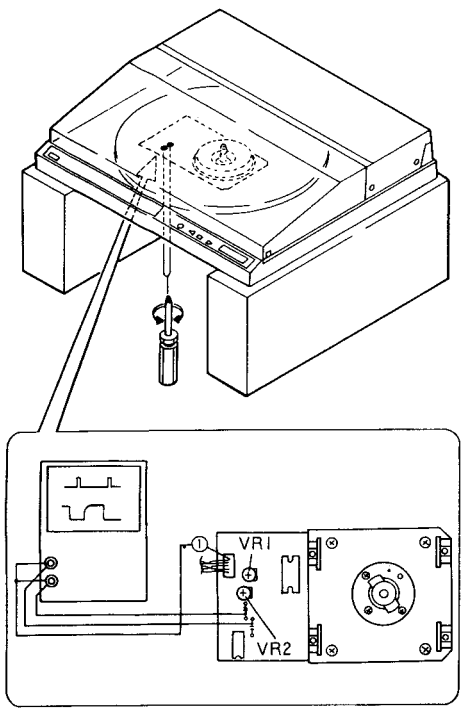


Fig. 14-7 Motor Operation Adjustment

14. RÉGLAGE

14.1 RÉGLAGE DU BRAS DE PICK-UP

1. En mettant l'appareil sous tension, placer un disque d'essai (PLS-2001 ou PLS-4001, avec le côté A vers le haut) sur la platine de lecture de disques.
2. Presser la touche de départ/arrêt (START/STOP) et vérifier la position du bras de pick-up lorsqu'il se pose sur le disque.
3. Soulever le couvercle anti-poussière et tourner la vis ❶ de réglage jusqu'à ce que le bras de pick-up soit aligné avec le disque.

- Lorsque le bras de pick-up se pose sur la droite du sillon initial, (au cas où le compte est inférieur à la tolérance normale de compte) tourner la vis ❶ ole réglage dans le sens contraire des aiguilles d'une montre.
- Lorsque le bras de pick-up se pose sur la gauche du sillon initial, (au cas où le compte est supérieur à la tolérance normale de compte (tourner la vis ❶ de réglage dans le sens des aiguilles d'une montre.
- Lorsque l'on utilise le disque d'essai, la position sera réglée pour les disques de 30 cm.

Disque d'essai	Position de réglage
PLS2001	310 ± 3 comptes
PLS4001	13 ± 6 comptes

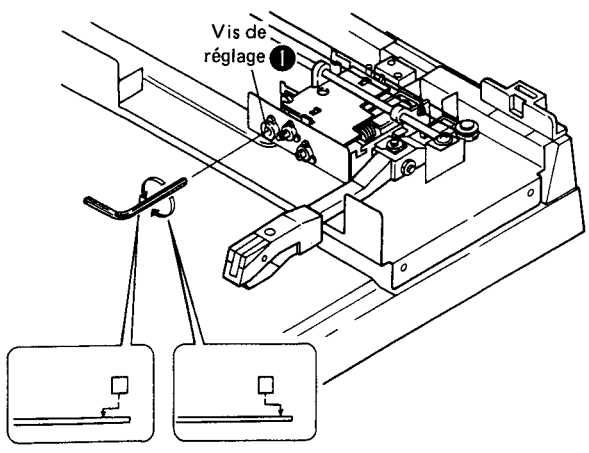


Fig. 14-1 Réglage du bras de pick-up

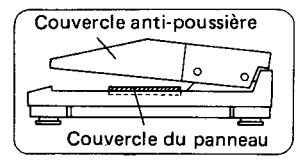
14.2 RÉGLAGE DU GAIN DU SENSEUR D'ALIGNEMENT ET DU DÉCENTRAGE

• Réglage du Gain

1. Déposer le couvercle anti-poussière et le couvercle du panneau.
2. Connecter un voltmètre CC à la broche No. 4 (GND) et à la broche No. 5 (TRKG) de CN5.
3. Tourner la vis ❷ dans le sens contraire des aiguilles d'une montre et tirer le bloc du chariot en avant.
4. Mettre l'appareil sous tension et tout en poussant le bras de pick-up vers le centre (comme indiqué sur la figure), régler VR201 (TRKG) jusqu'à ce que le voltmètre CC enregistre 3V ± 0,1V.

• Réglage de Décentrage

5. Remettre le bras de pick-up sur la position de repos. (Il retournera automatiquement lorsqu'on le relâche).
6. Pour le régler, tourner la vis ❷ dans le sens des aiguilles d'une montre jusqu'à ce que le voltmètre CC enregistre 1,1V ± 0,1V.



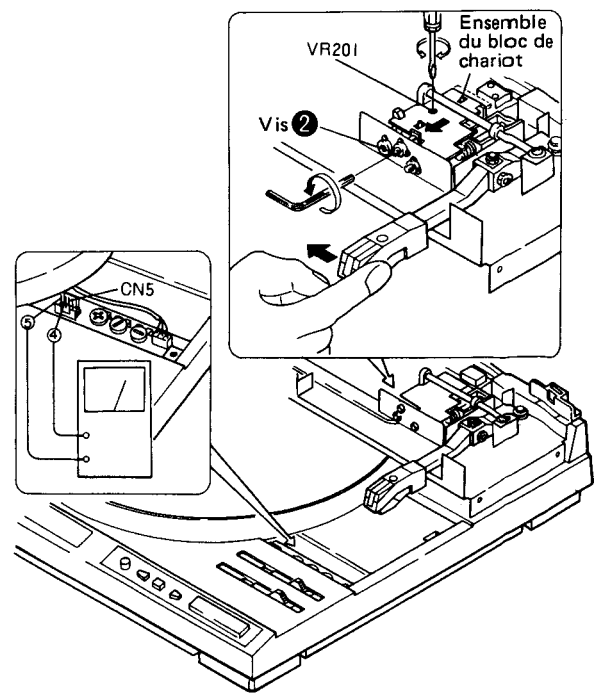


Fig. 14-2 Réglage du gain du senseur d'alignement et du décentrage

14.3 RÉGLAGE DE LA HAUTEUR DU BRAS DE PICK-UP

1. Avec le couvercle anti-poussière déposé, insérer deux pièces d'écartement de 6 mm (une sur la droite et l'autre sur la gauche) pour retourner à la situation à laquelle le couvercle anti-poussière et la base du mécanisme étaient connectés.
2. Placer un disque de 30 cm sur le plateau, mettre l'appareil sous tension, et en utilisant le commutateur de location (◀◀), déplacer le bras de pick-up à environ 100 mm du centre du plateau.
3. Tourner la vis ❸ jusqu'à ce que le bout de l'aiguille soit à 5 à 7 mm au-dessus de la surface du disque.

- En tournant la vis dans le sens des aiguilles d'une montre, abaisser l'aiguille.
- En tournant la vis dans le sens contraire des aiguilles d'une montre, soulever l'aiguille.

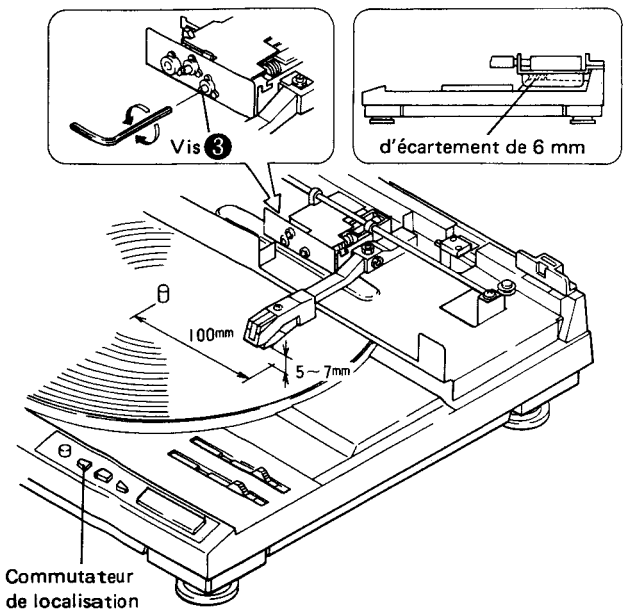


Fig. 14.3 Réglage de la hauteur du bras de pick-up

14.4 RÉGLAGE DU DÉCENTRAGE DU SENSEUR DE BANDE

1. Effectuer ce réglage APRES avoir exécuté le réglage de la hauteur du bras de pick-up.
2. Déposer le plateau et le couvercle du panneau (noir).
3. Remettre en position le plateau, déconnecter CN4 et connecter un voltmètre CC ou un oscilloscope à la broche No. 2 (SADO) et à la broche No. 3 (5V) de CN5.
4. Mettre l'appareil sous tension et tourner VR1 (GAIN 1) et VR2 (GAIN 2) dans le sens contraire des aiguilles d'une montre jusqu'à ce qu'ils soient bloqués.
5. Régler VR3 (DECENTRAGE) jusqu'à ce que le voltmètre CC ou l'oscilloscope (gamme CC) indique 0 ± 30 mV.

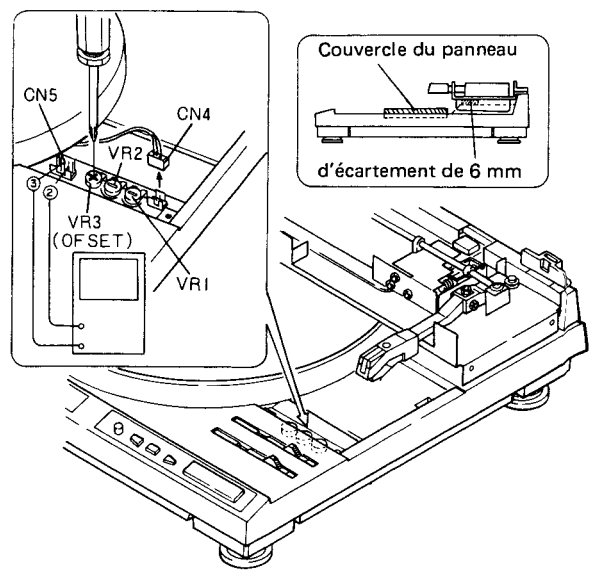


Fig. 14-4 Réglage de décentrage du senseur de bande

14.5 RÉGLAGE DU GAIN DU SENSEUR DE BANDE

- Effectuer ce réglage APRES avoir exécuté le réglage du décentrage du senseur de bande.

1. Mettre l'appareil hors de service, brancher sur CN4, et connecter un voltmètre CA (soupape) à la broche No. 1 et à la broche No. 3 de CN5.
2. Après avoir placé le disque d'essai PL-4001 sur le plateau avec le côté B vers le haut (le côté sans sillon), placer la feuille de réglage de gain en caoutchouc à rainures (MLB-3199) sur le disque d'essai.
3. Mettre l'appareil sous tension et régler la vitesse sur 45 tours/minute. En utilisant le commutateur de localisation (◀◀), déplacer le bras de pick-up au-dessus du centre des fentes de la feuille en caoutchouc à rainures, comme illustré par la figure 9-5.
4. Régler VR1 (GAIN 1) jusqu'à ce que le voltmètre CA (soupape) indique 55 ± 3 mV.
5. Ouvrir la base du mécanisme (le bras de pick-up retournera automatiquement à la position de repos), et enlever la feuille en caoutchouc à rainures. Remettre le bras de pick-up sur sa position antérieure en utilisant le commutateur de localisation (◀◀).
6. Connecter un voltmètre CC ou un oscilloscope à la broche No. 2 (SADO) et à la broche No. 3 (5V).
7. Régler VR2 (GAIN 2) jusqu'à ce que le voltmètre CC ou l'oscilloscope (gamme CC) indique 0 ± 30mV.

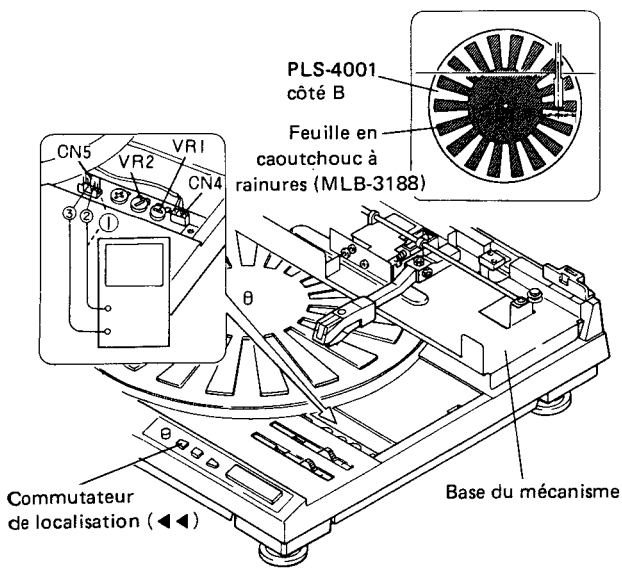


Fig. 14-5 Réglage du gain du senseur de bande

14.6 RÉGLAGE DE LA SÉLECTION DE PROGRAMME

- Ce réglage s'effectue avec la platine de l'atténuateur (série CT-Z99W) et son cordon de branchement déconnectés.

1. Régler le commutateur de sensibilité du senseur sur "H", et placer le disque d'essai PLS-4001 avec le côté A vers le haut, sur le plateau.
2. Régler le commutateur de programme sur le numéro de sélection 2 et le numéro de sélection 7.
3. Une fois que l'aiguille s'est mise au repos dans la bande avant la sélection 2, veiller à ce qu'un timbre de 1 kHz de 3 à 4 secondes soit produit. Régler le bras de pick-up s'il ne se met pas au repos dans la bande.
4. Pour le régler, presser le bouton EV et soulever le bras de pick-up. Tourner la vis de réglage jusqu'à ce que l'aiguille vienne se reposer dans la bande.
5. Pour vérifier si ce réglage est correct, ABAISSER le bras de pick-up et pesser le commutateur SKIP (▶▶).

- Si l'aiguille s'abaisse sur la sélection précédente (le timbre de 1 kHz est trop long), tourner la vis dans le sens contraire des aiguilles d'une montre.
- Si l'aiguille s'abaisse sur la selection désirée (le timbre de 1 kHz est trop court), tourner la vis dans le sens des aiguilles d'une montre.

6. Après avoir réglé le bras de pick-up, presser le bouton de saut, et veiller à ce qu'un signal de 1 kHz soit produit avant la sélection numéro 7.

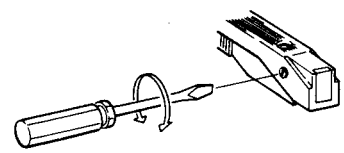


Fig. 14-6 Réglage de la sélection de programme

14.7 RÉGLAGE DU FONCTIONNEMENT DU MOTEUR

1. Déposer la base inférieure.
2. Connecter le Ach de l'oscilloscope à deux traces, au bloc de la plaquette de circuit, à la broche No. 15 de Q3 (PD0008), et GND. Régler l'axe de temps de telle manière qu'une période de la forme d'onde de sortie soit égale à 8 divisions en mode de 33 tours/minute. Fig. 14-8 (a).
2. Connecter le Bch de l'oscilloscope à deux traces à la broche No. 15 de Q1 (PA2017), et GND. Régler VR2 (45 tours/minute) de telle manière que le rapport entre les formes d'onde Ach et Bch en mode de 45 tours/minute soit celui indiqué par la Fig. 14-8 (b).
3. Régler le plateau sur 33 tours/minute et régler VR1 (33 tours/minute) jusqu'à ce que le rapport entre les formes d'onde de Ach et Bch soit celui indiqué par la Fig. 14-8 (c).
4. Toujours effectuer les réglages de fonctionnement du moteur en commençant avec le mode de 45 tours/minute et en terminant avec celui 33 tours/minute.

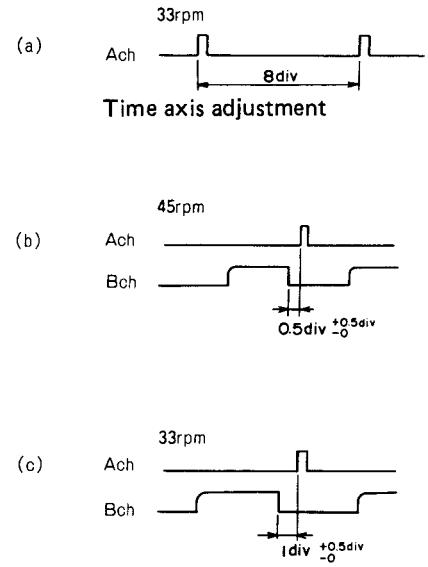
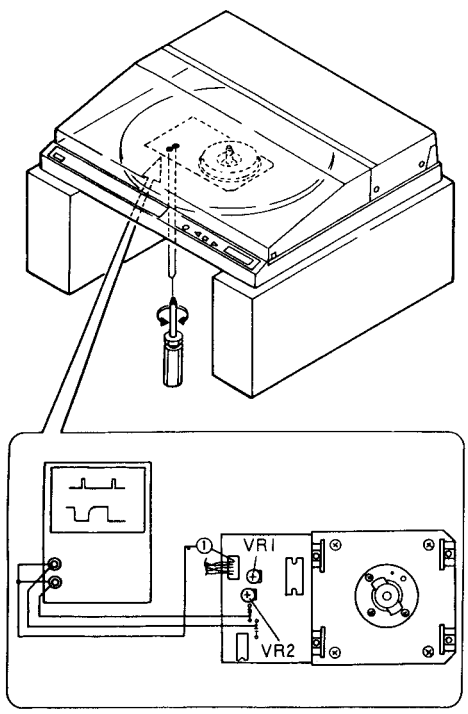


Fig. 14-8 Formes d'onde de réglage du fonctionnement du moteur



Réglage de l'axe de temps

14. AJUSTE

14.1 AJUSTE DEL BRAZO DE FONOCAPTOR

1. Con el aparato encendido, ponga un disco de prueba (PLS-2001 o PLS-4001, lado A hacia arriba), sobre el plato giratorio.
2. Presionar el botón de ARRANQUE-PARADA y verificar la posición del brazo de fonocaptor cuando se posa sobre el disco.
3. Levantar la cubierta para el polvo y girar el tornillo ❶ de ajuste hasta que el brazo de fonocaptor quede alineado con el disco.

- Cuando el brazo de fonocaptor descanse a la derecha de la ranura inicial, (cuando la cuenta es menor que la tolerancia de cuenta estándar), girar el tornillo ❶ de ajuste en el sentido contrario a los punteros del reloj.
- Cuando el brazo de fonocaptor descanse a la izquierda de la ranura de descanso, (cuando la cuenta es mayor que la tolerancia de cuenta estándar), girar el tornillo ❶ de ajuste en el sentido a los punteros del reloj.
- Cuando se esté usando el disco de prueba, la posición quedará fijada para discos de 30 cm.

Disco de prueba	Posición de ajuste
PLS2001	310 ± 3 cuentas
PLS4001	13 ± 6 cuentas

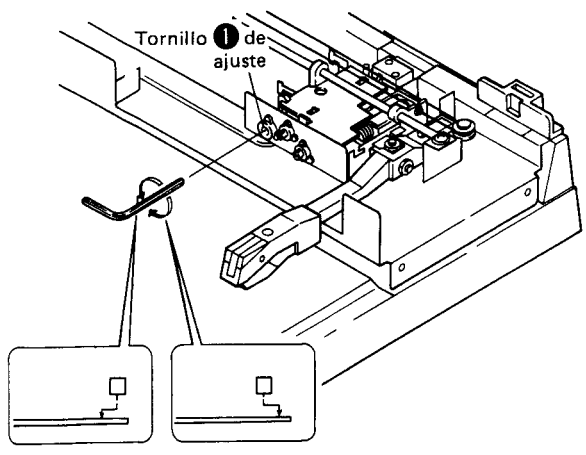


Fig. 14-1 Ajuste del brazo fonocaptor

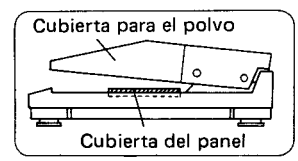
14.2 AJUSTE DE GANANCIA DEL SENSOR DE SEGUIMIENTO Y DE DESCENTRADO

• Ajuste de Ganancia

1. Sacar la cubierta para el polvo y la cubierta del panel.
2. Conectar un voltímetro de C.C. al pasador No. 4 (GND) y al pasador No. 5 (TRKG) del CN5.
3. Girar el tornillo ❷ en el sentido contrario a los punteros del reloj y tirar la unidad de carro hacia adelante.
4. Encender el aparato y mientras se empuja el brazo de fonocaptor hacia el centro (como se muestra en la ilustración) ajustar el VR201 (TRKG) hasta que el voltímetro de C.C. registre 3V ± 0,1V.

• Ajuste de Descentrado

5. Haga volver el brazo de fonocaptor a la posición de descanso. (Volverá por sí mismo cuando usted lo libere.)
6. Para ajustarlo, girar el tornillo ❷ en el sentido de los punteros del reloj hasta que el voltímetro de C.C. registre 1,1V ± 0,1V.



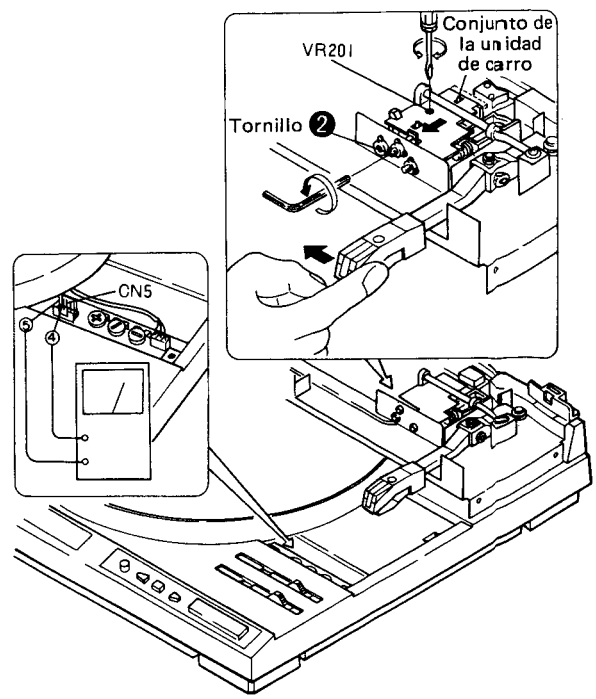


Fig. 14-2 Ganacia del sensor de seguimiento y ajuste de descentrado

14.3 AJUSTE DE LA ALTURA DEL BRAZO DE FONOCAPTOR

1. Con la cubierta para el polvo desmontada, insertar dos chavetas de 6mm (una derecha y una a la izquierda) para emular la situación en que la cubierta para el polvo y la base del mecanismo están conectadas.
2. Poner un disco de 30 cm sobre el plato giratorio, encender el aparato, y usando el conmutador de localización (◀◀) mover el brazo de fonocaptor a una distancia de aproximadamente 100 mm del centro del plato giratorio.
3. Girar el tornillo ❸ hasta que la punta de la aguja esté de 5 a 7 mm sobre la superficie del disco.
   - Girando el tornillo en el sentido de los punteros del reloj, se baja la aguja.
   - Girando el tornillo en el sentido contrario a los punteros del reloj, se sube la aguja.

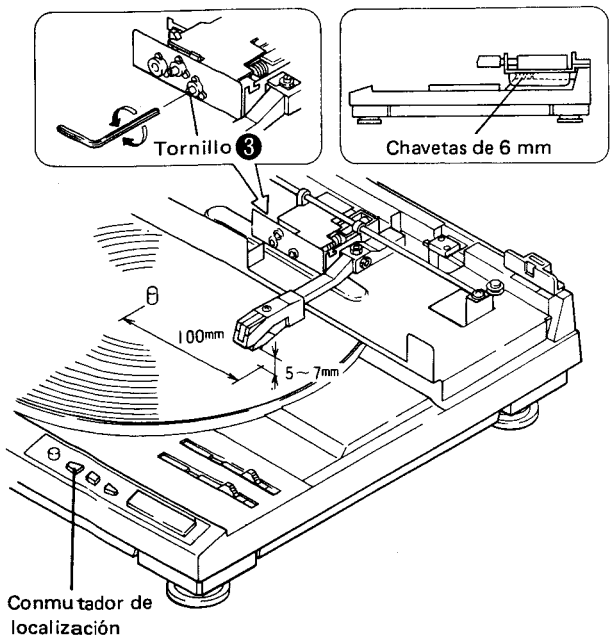


Fig. 14-3 Ajuste de la altura del brazo de fonocaptor

14.4 AJUSTE DE DESCENTRADO DEL SENSOR DE BANDA

- Hacer este ajuste DESPUES de hacer el ajuste de la altura del brazo de fonocaptor.

1. Con la cubierta para el polvo desmontada, insertar dos chavetas (una a la derecha y una a la izquierda) para emular la situación en que la cubierta para el polvo y la base del mecanismo están conectadas.
2. Sacar el plato giratorio y la cubierta del panel (negra).
3. Reposicionar el plato giratorio, desconectar el CN4 y conectar un voltímetro de C.C. o un osciloscopio al pasador No. 2 (SADO) y al pasador No. 3 (5V) del CN5.
4. Encender el aparato y girar el VR1 (GANANCIA1) y VR2 (GANACIA 2) en el sentido contrario a los punteros del reloj hasta que dejen de girar.
5. Ajustar el VR3 (DESCENTRADO) hasta que el voltímetro de C.C. o el osciloscopio (rango de C.C.) indique 0 ± 30 mV.

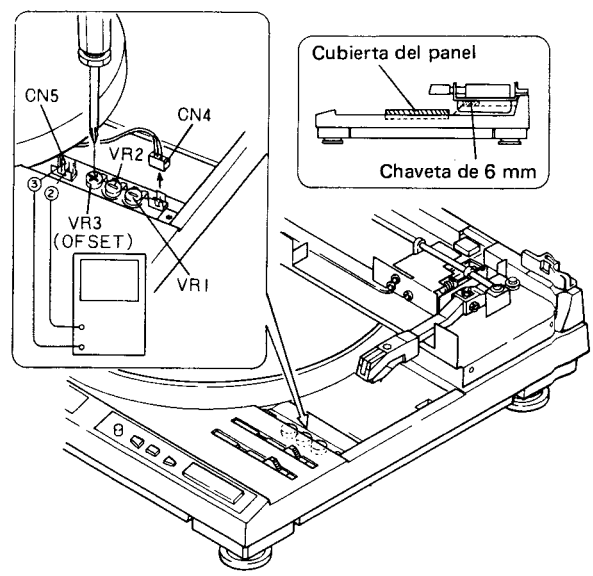


Fig. 14-4 Ajuste de descentrado del sensor de banda

14.5 AJUSTE DE GANANCIA DEL SENSOR DE BANDA

- Hacer este ajuste DESPUES de efectuar el ajuste de descentrado del sensor de banda.

1. Apagar el aparato, enchufar el CN4, y conectar un voltímetro de C.C. (válvula) al pasador No. 1 y No. 3 del CN5.
2. Después de poner el disco de prueba PLS-4001 sobre el plato giratorio con el lado B hacia arriba (el lado sin ranura), poner la hoja de ajuste de ganacia de caucho moscada (MLB-3199) sobre el disco de prueba.
3. Encender el aparato y fijar la velocidad a 45 rpm. Usando el conmutador de localización (◀◀), mover el brazo de fonocaptor sobre el centro de las muescas en la hoja de caucho moscado, como se muestra en la figura 9-5.
4. Ajustar el VR1 (GANANCIA 1) hasta que el voltímetro de C.C. (válvula) registre 55 ± 3 mV.
5. Abrir la base del mecanismo (el brazo de fonocaptor volverá a la posición de descanso por sí mismo) y sacar la hoja de caucho moscada. Hacer volver el brazo de fonocaptor al mismo lugar que antes usando el conmutador de localización (◀◀).
6. Conectar un voltímetro de C.C. o un osciloscopio al pasador No. 2 (SADO) y al pasador No. 3 (5V).
7. Ajustar el VR2 (GANANCIA 2) hasta que el voltímetro o el osciloscopio (rango de C.C.) registre 0 ± 30 mV.

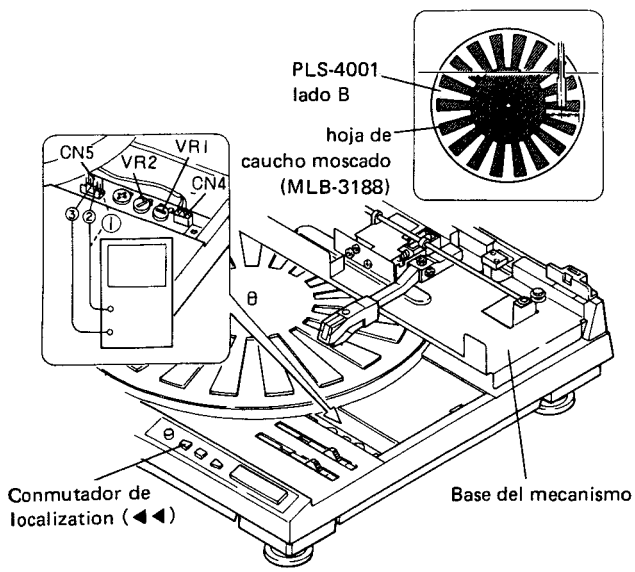


Fig. 14-5 Ajuste de ganancia del sensor de banda

14.6 AJUSTE DE SELECCIÓN DE PROGRAMAS

- Este ajuste se hace con la cubierta de atenuación (Series CT-Z99W) y su condón de conexión desconectados.

1. Fijar el conmutador de sensibilidad del sensor en "H", y poner el disco de prueba PLS-4001 con el lado A hacia arriba sobre el plato giratorio.
2. Fijar el conmutador de programas en el número de selección 2 y en le número de selección 7.
3. Después que la aguja llega a su posición de descanso en la banda antes de la selección 2, asegurarse de que hay un tono de 1 kHz por 3 – 4 segundos. Ajustar el brazo de fonocaptor si es que éste no llega a la posición de descanso dentro de la banda.
4. Para ajustarlo, presionar el botón EV y levantar el brazo de fonocaptor. Girar el tornillo de ajuste hasta que la aguja llegue a descansar dentro de la banda.
5. Para controlar si el ajuste es correcto, BAJAR el brazo de fonocaptor y presionar el conmutador SKIP (▶▶).

- Si la aguja baja en la selección previa (el tono de 1 kHz es muy prolongado), girar el tornillo en el sentido contrario a los punteros del reloj.
- Si la aguja baja en la selección deseada (el tono de 1 kHz es muy corto) girar el tornillo en el sentido de los punteros del reloj).

6. Después de ajustar el brazo de fonocaptor, pulsar el botón de escape y asegurarse de que hay una señal de 1 kHz antes de la selección número 7.

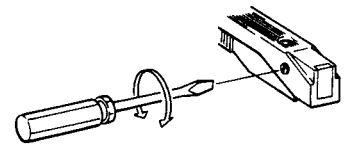


Fig. 14-6 Ajuste de selección de programas

14.7 AJUSTE DE LA OPERACIÓN DEL MOTOR

1. Sacar la sub-base.
2. Conectar el Ach del osciloscopio de trazas dobles a la unidad de tablero de circuito, al pasador No. 15 de Q3 (PD0008) y GND. Ajustar el eje de tiempo, de manera que la forma de onda de salida sea igual a 8 divisiones en el modo de 33 rpm. Figura 14-8 (a).
2. Conectar el Bch del osciloscopio de trazas dobles a Q1 (PA2017) pasador No. 15, y GND. Ajustar el VR2 (45 rpm) de manera que la relación entre las formas de onda de Ach y Bch en el modo de 45 rpm sea como se muestra en la Fig. 14-8. (b).
3. Fijar el disco giratorio a 33 rpm y ajustar el VR1 (33 rpm) hasta que la relación entre las formas de onda Ach y Bch sea como se muestra en la Fig. 14-8 (c).
4. Siempre efectúe los ajustes de la operación del motor comenzando por 45 rpm y terminando con 33 rpm.

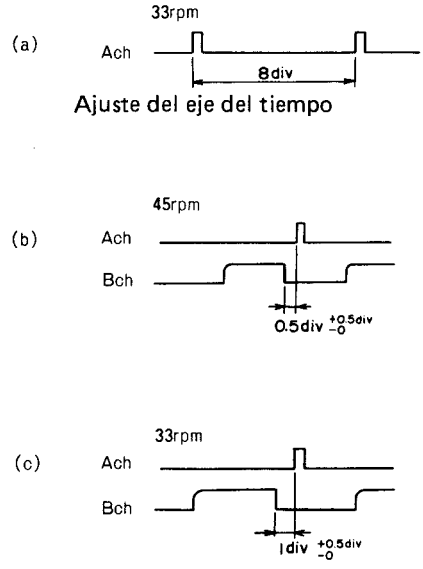


Fig. 14-8 Formas de onda de ajuste de la operación del motor

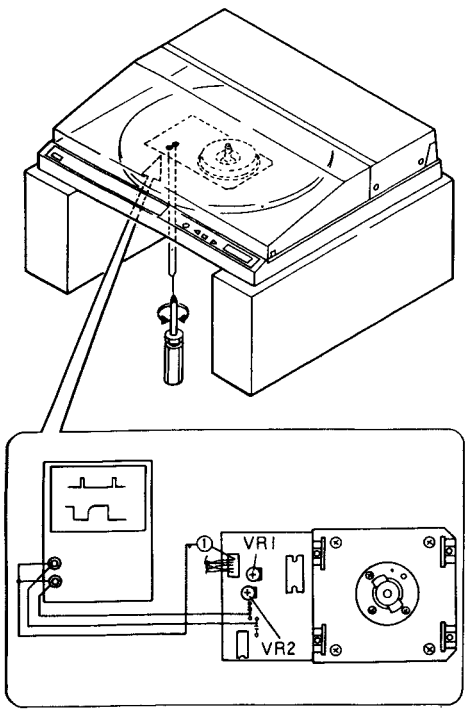
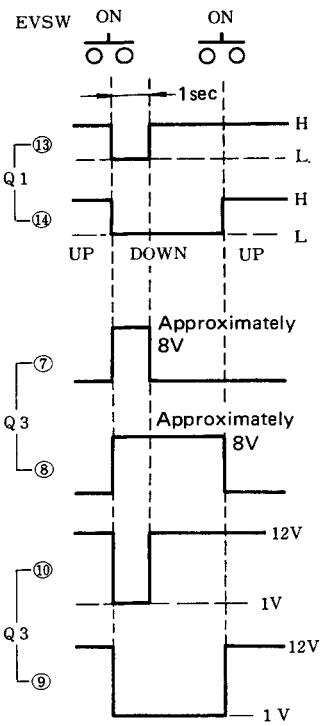


Fig. 14-7 Ajuste de la operación del motor.

Note:
- When the tonearm is on the rest it will not go UP or DOWN.
- Also, disconnect the cord leading to the fader deck (CT-Z99W).



The EV doesn't perform

Place a record on the turntable and using the locate switch, move the tonearm to the selection position

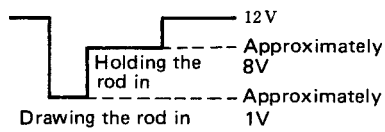
Does the UP LED go ON and OFF when the EV SW goes ON and OFF?
- NO → The switch doesn't work
- YES ↓

Do Q1 pins 13 and 14 alternately become "H" and "L" when the EV SW is turned ON?
- NO → Perform pattern and soldering checks from Q1 pins 13 and 14 to Q2 pins 2 and 3
- YES ↓

At that time do Q3 pins 7 and 8 change from approximately 0V to approximately 8V?
- NO → Perform pattern and soldering checks from Q2 pins 2, 3, 14, 15, to Q3 pins 7 and 8
- YES ↓

At that time do Q3 pins 9 and 10 change from approximately 12V to approximately 1V?
- NO → Is CN2 properly connected?
  - OK → Perform error and pattern checks from Q3 pins 9 and 10 to R40 and CN2 pin 3
    - OK → Perform error, pattern break, soldering, connection checks from CN 2 (female) to JP201, D201 and solenoid.
  - NO ↓
- YES ↓

At that time were the D101 cathode voltage readings as shown below?

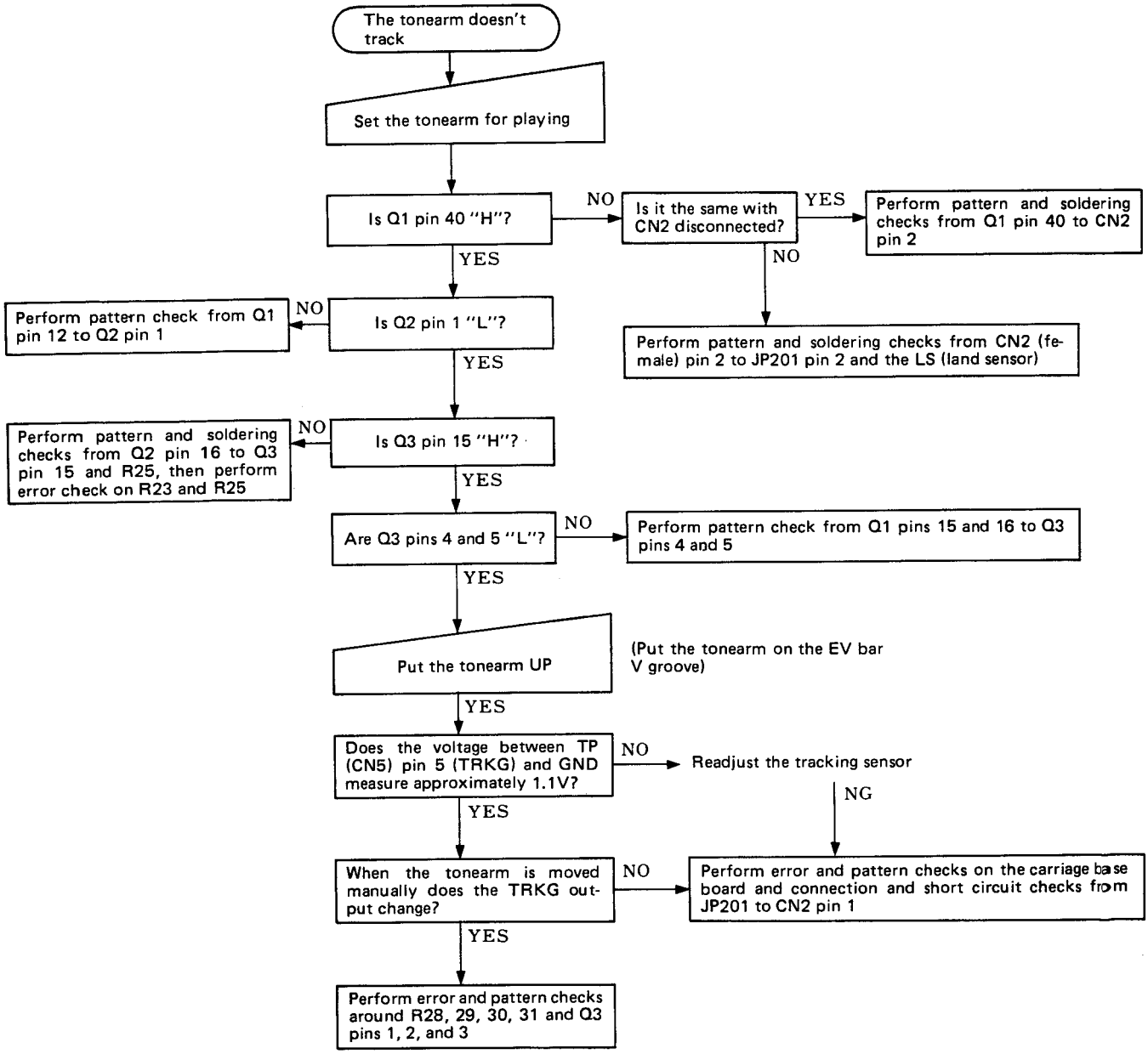


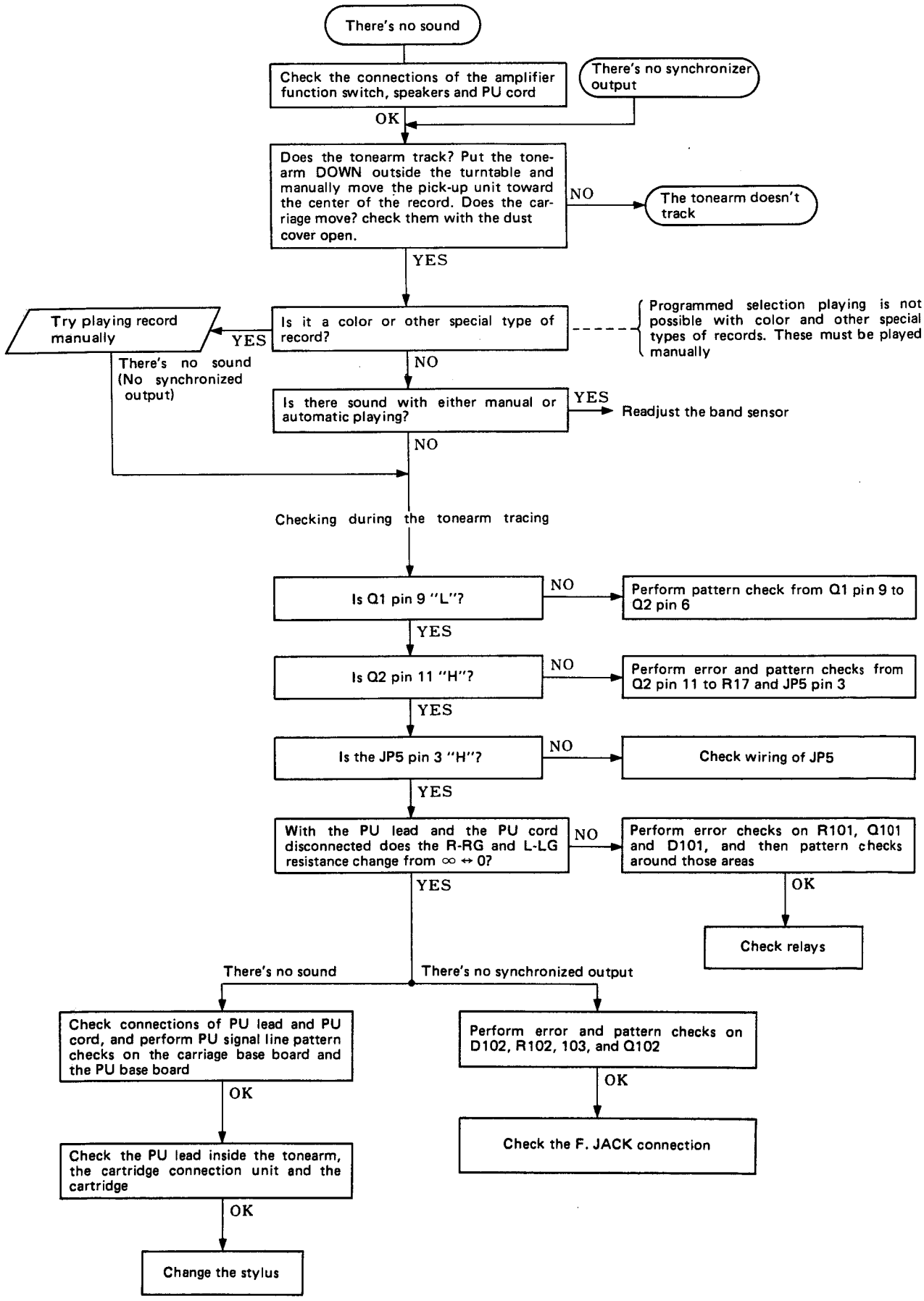
- YES → Faulty mechanism, check to see if the solenoid plunger is catching on something
- NO ↓

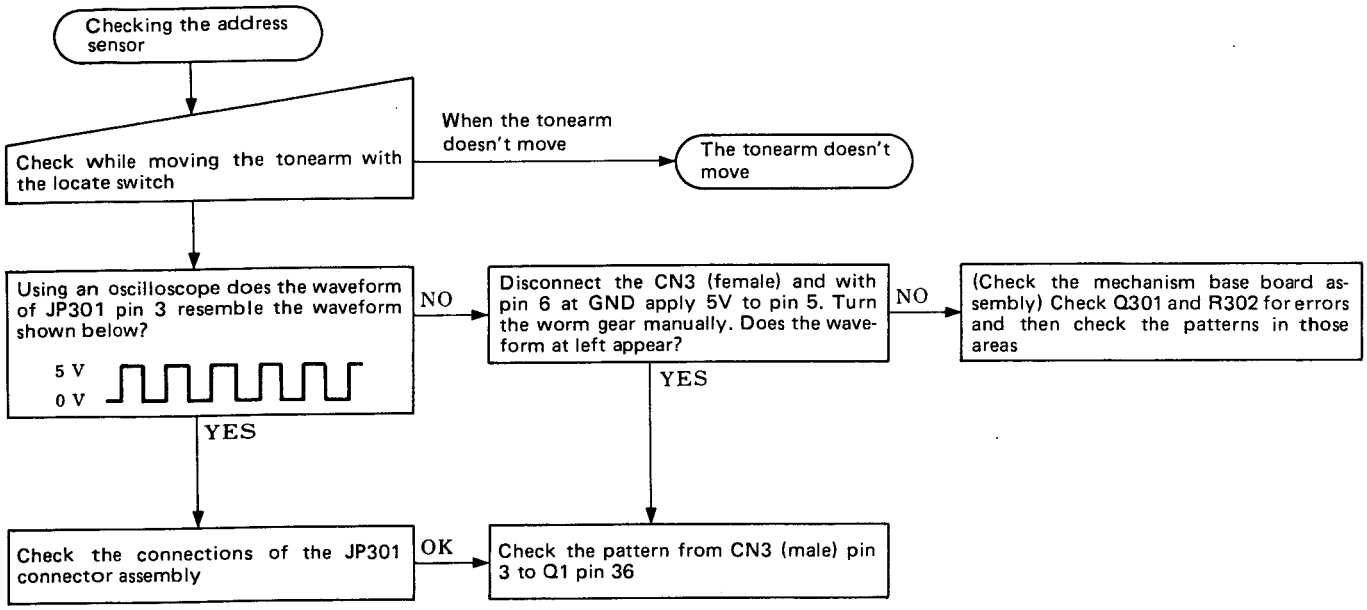
Unsolder the EV solenoid lead and make sure the solenoid wire wound resistor measures approximately 70Ω
- NO → Faulty solenoid
- YES ↓

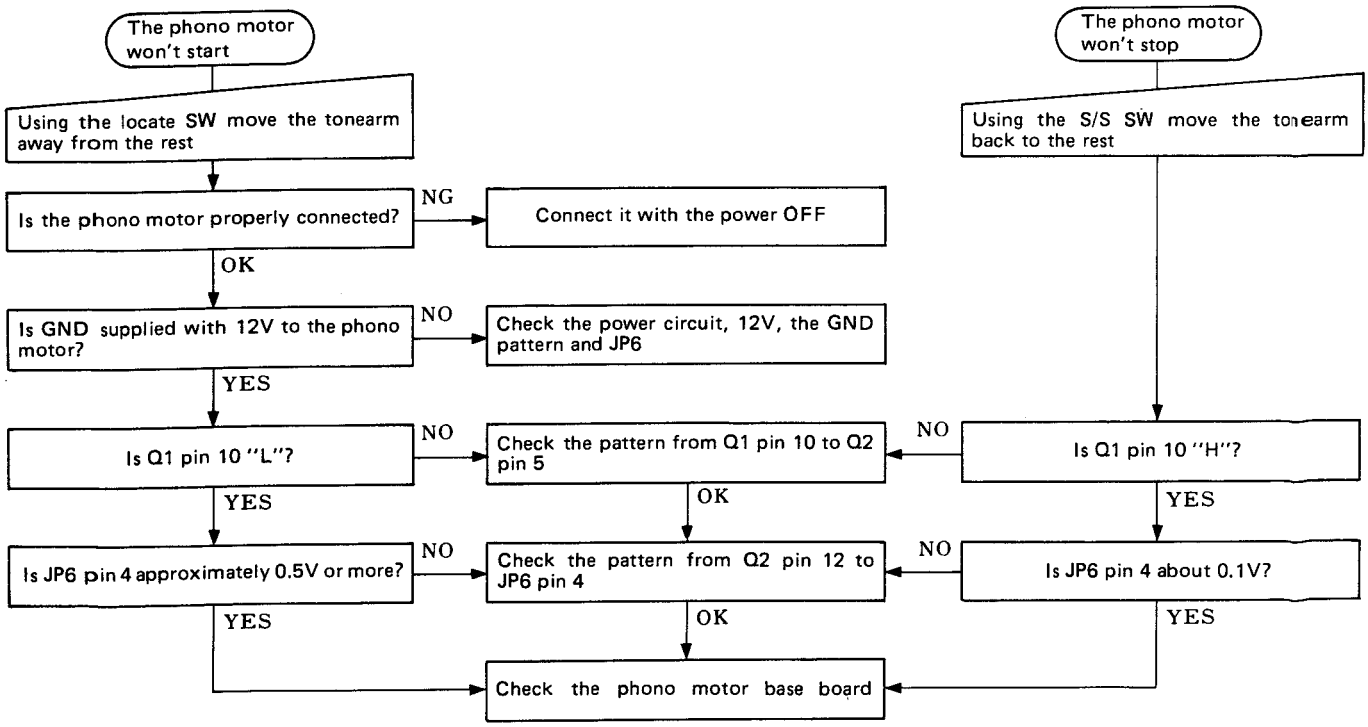
(Be careful of which direction D201 is facing and disconnect CN2 (female)) Is the resistance approximately 70Ω between pins 3 and 4?
- NO → Perform error and pattern checks from CN2 (female) and JP201 and D201
- YES ↓

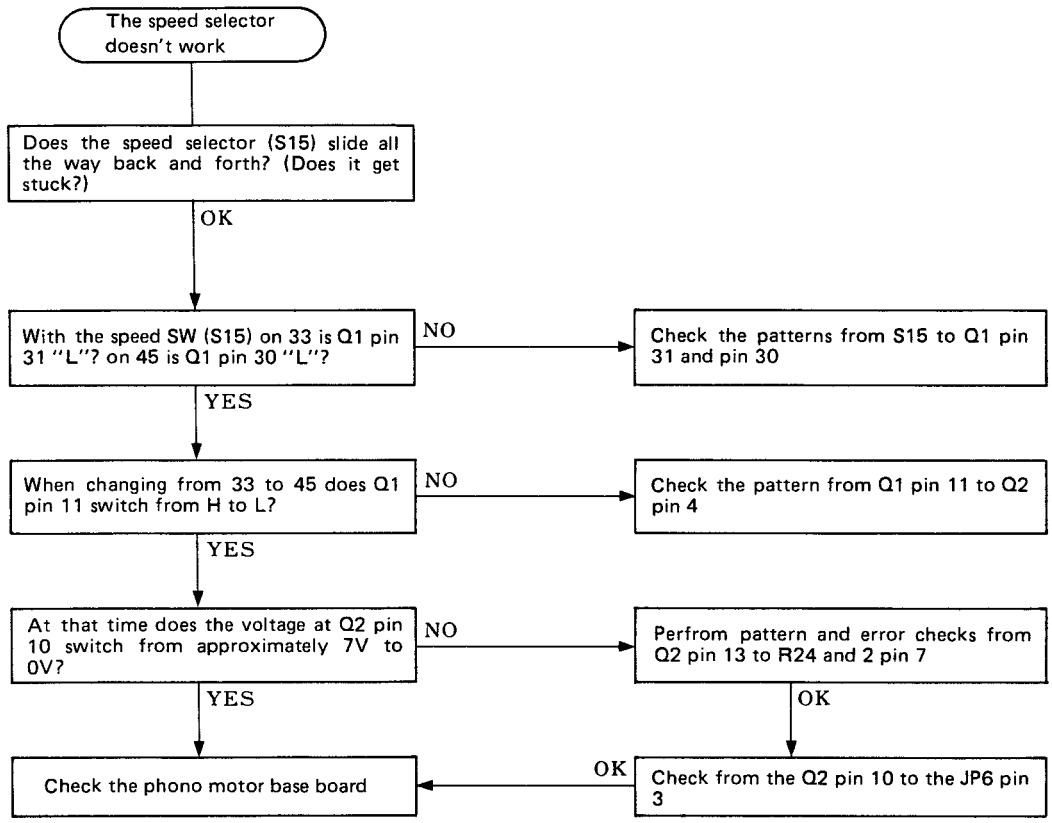
Perform error and pattern checks from Q3 pins 9 and 10 to R40 and CN2 pin 3

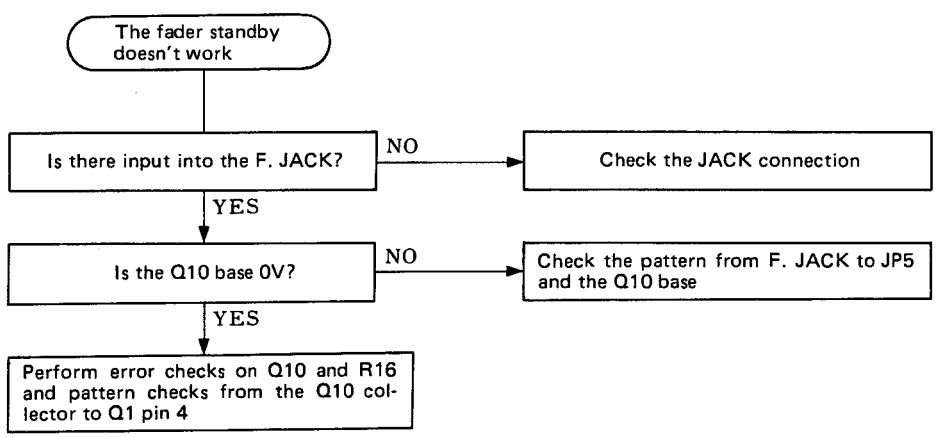

The tonearm doesn't track
Set the tonearm for playing
Is Q1 pin 40 "H"?
NO
Is it the same with CN2 disconnected?
YES
Perform pattern and soldering checks from Q1 pin 40 to CN2 pin 2
NO
YES
Perform pattern check from Q1 pin 12 to Q2 pin 1
NO
Is Q2 pin 1 "L"?
Perform pattern and soldering checks from CN2 (female) pin 2 to JP201 pin 2 and the LS (land sensor)
YES
Perform pattern and soldering checks from Q2 pin 16 to Q3 pin 15 and R25, then perform error check on R23 and R25
NO
Is Q3 pin 15 "H"?
YES
Are Q3 pins 4 and 5 "L"?
NO
Perform pattern check from Q1 pins 15 and 16 to Q3 pins 4 and 5
YES
Put the tonearm UP
(Put the tonearm on the EV bar V groove)
YES
Does the voltage between TP (CN5) pin 5 (TRKG) and GND measure approximately 1.1V?
NO
Readjust the tracking sensor
NG
YES
When the tonearm is moved manually does the TRKG output change?
NO
Perform error and pattern checks on the carriage base board and connection and short circuit checks from JP201 to CN2 pin 1
YES
Perform error and pattern checks around R28, 29, 30, 31 and Q3 pins 1, 2, and 3

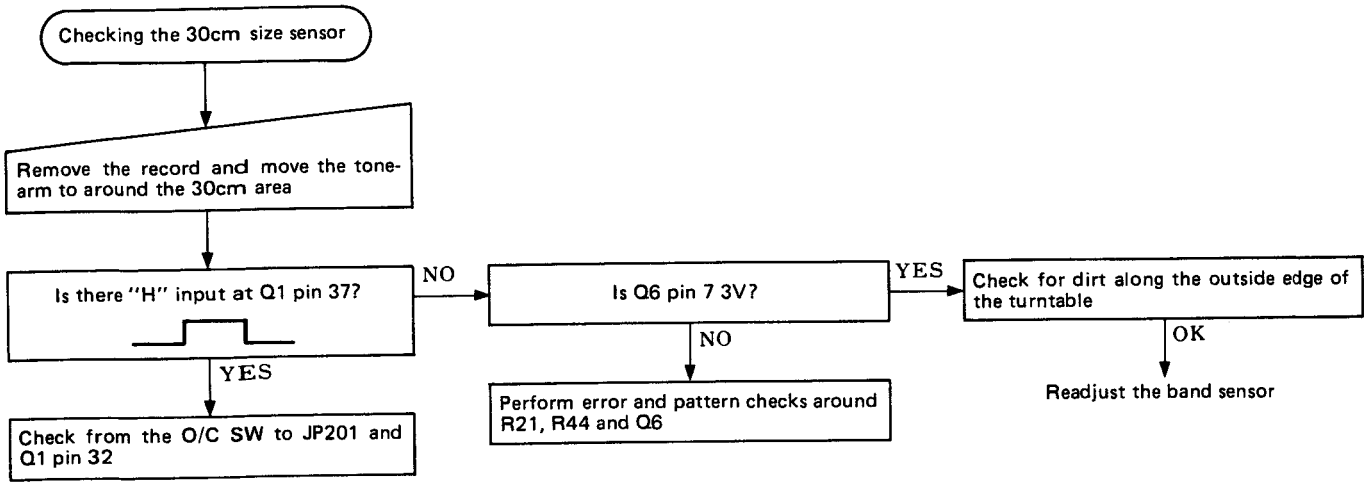

There's no sound
Check the connections of the amplifier function switch, speakers and PU cord
There's no synchronizer output
OK
Does the tonearm track? Put the tonearm DOWN outside the turntable and manually move the pick-up unit toward the center of the record. Does the carriage move? check them with the dust cover open.
NO
The tonearm doesn't track
YES
Try playing record manually
YES
Is it a color or other special type of record?
Programmed selection playing is not possible with color and other special types of records. These must be played manually
There's no sound (No synchronized output)
NO
Is there sound with either manual or automatic playing?
YES
Readjust the band sensor
NO
Checking during the tonearm tracing
Is Q1 pin 9 "L"?
NO
Perform pattern check from Q1 pin 9 to Q2 pin 6
YES
Is Q2 pin 11 "H"?
NO
Perform error and pattern checks from Q2 pin 11 to R17 and JP5 pin 3
YES
Is the JP5 pin 3 "H"?
NO
Check wiring of JP5
YES
With the PU lead and the PU cord disconnected does the R-RG and L-LG resistance change from ∞ ↔ 0?
NO
Perform error checks on R101, Q101 and D101, and then pattern checks around those areas
YES
OK
Check relays
There's no sound
There's no synchronized output
Check connections of PU lead and PU cord, and perform PU signal line pattern checks on the carriage base board and the PU base board
OK
Check the PU lead inside the tonearm, the cartridge connection unit and the cartridge
OK
Change the stylus
Perform error and pattern checks on D102, R102, 103, and Q102
OK
Check the F. JACK connection

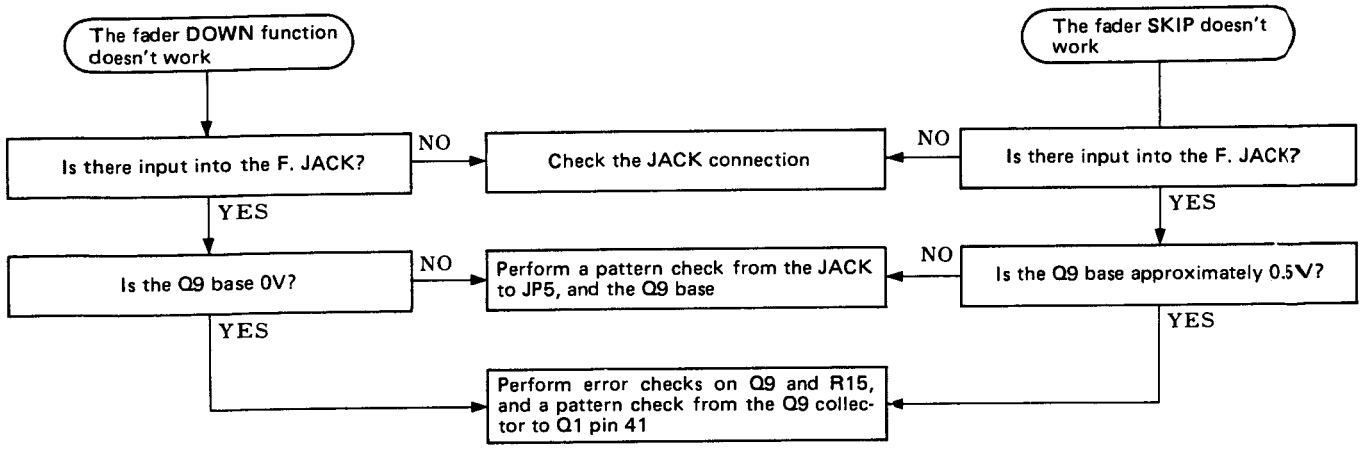

Checking the address sensor
Check while moving the tonearm with the locate switch
When the tonearm doesn't move
The tonearm doesn't move
Using an oscilloscope does the waveform of JP301 pin 3 resemble the waveform shown below?
5 V
0 V
NO
Disconnect the CN3 (female) and with pin 6 at GND apply 5V to pin 5. Turn the worm gear manually. Does the waveform at left appear?
NO
(Check the mechanism base board assembly) Check Q301 and R302 for errors and then check the patterns in those areas
YES
YES
Check the connections of the JP301 connector assembly
OK
Check the pattern from CN3 (male) pin 3 to Q1 pin 36

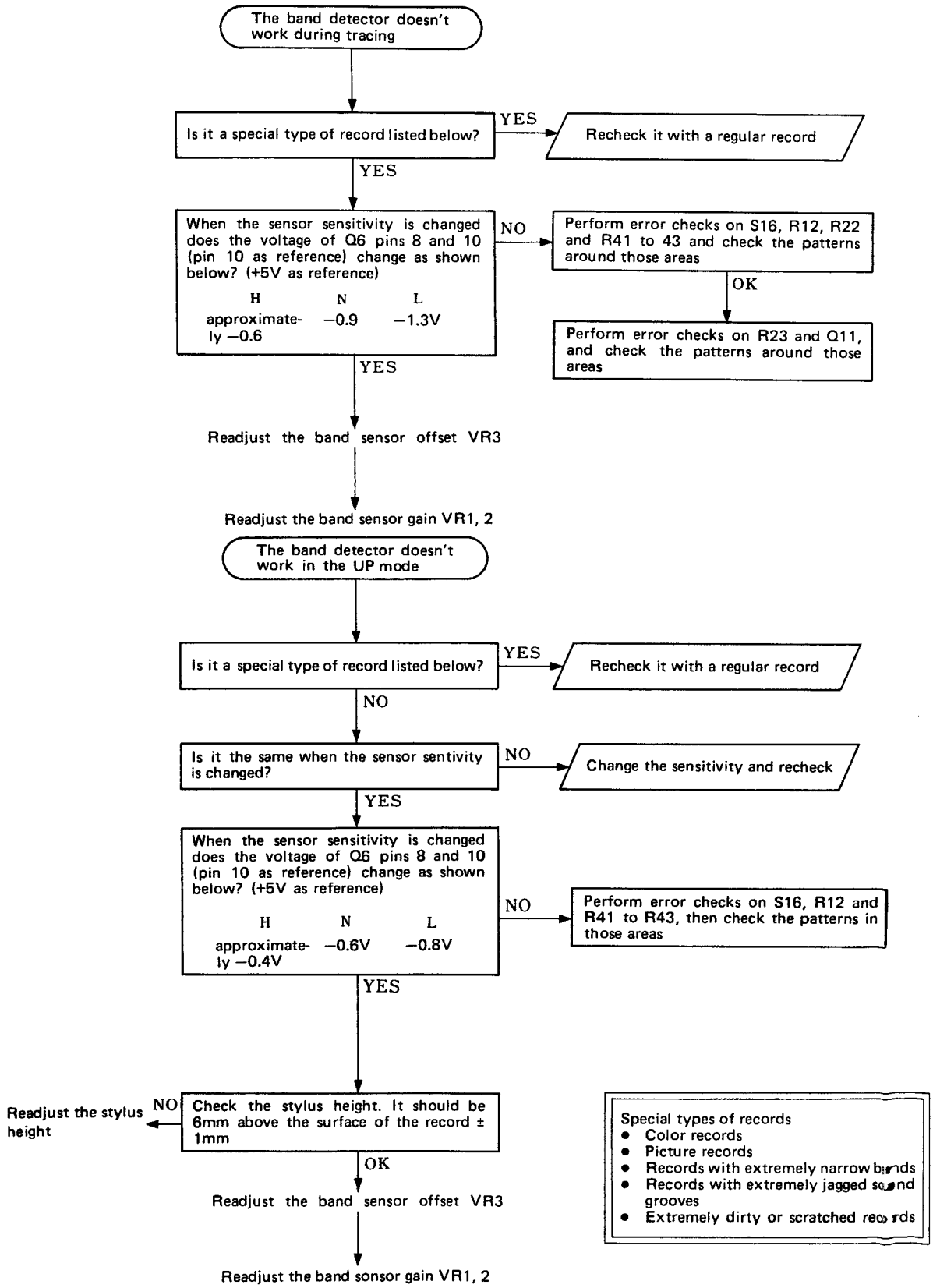

The phono motor won't start
Using the locate SW move the tonearm away from the rest
Is the phono motor properly connected?
NG
Connect it with the power OFF
OK
Is GND supplied with 12V to the phono motor?
NO
Check the power circuit, 12V, the GND pattern and JP6
YES
Is Q1 pin 10 "L"?
NO
Check the pattern from Q1 pin 10 to Q2 pin 5
YES
OK
Is JP6 pin 4 approximately 0.5V or more?
NO
Check the pattern from Q2 pin 12 to JP6 pin 4
YES
OK
Check the phono motor base board
The phono motor won't stop
Using the S/S SW move the tonearm back to the rest
Is Q1 pin 10 "H"?
NO
YES
Is JP6 pin 4 about 0.1V?
NO
YES


The speed selector doesn't work
Does the speed selector (S15) slide all the way back and forth? (Does it get stuck?)
OK
With the speed SW (S15) on 33 is Q1 pin 31 "L"? on 45 is Q1 pin 30 "L"?
NO
Check the patterns from S15 to Q1 pin 31 and pin 30
YES
When changing from 33 to 45 does Q1 pin 11 switch from H to L?
NO
Check the pattern from Q1 pin 11 to Q2 pin 4
YES
At that time does the voltage at Q2 pin 10 switch from approximately 7V to 0V?
NO
Perfrom pattern and error checks from Q2 pin 13 to R24 and 2 pin 7
YES
OK
Check the phono motor base board
OK
Check from the Q2 pin 10 to the JP6 pin 3


The fader standby doesn't work
Is there input into the F. JACK?
NO
Check the JACK connection
YES
Is the Q10 base 0V?
NO
Check the pattern from F. JACK to JP5 and the Q10 base
YES
Perform error checks on Q10 and R16 and pattern checks from the Q10 collector to Q1 pin 4


Checking the 30cm size sensor
Remove the record and move the tone-arm to around the 30cm area
Is there "H" input at Q1 pin 37?
NO
YES
Check from the O/C SW to JP201 and Q1 pin 32
Is Q6 pin 7 3V?
NO
YES
Perform error and pattern checks around R21, R44 and Q6
Check for dirt along the outside edge of the turntable
OK
Readjust the band sensor


The fader DOWN function doesn't work
Is there input into the F. JACK?
NO
YES
Is the Q9 base 0V?
NO
YES
Check the JACK connection
Perform a pattern check from the JACK to JP5, and the Q9 base
Perform error checks on Q9 and R15, and a pattern check from the Q9 collector to Q1 pin 41
The fader SKIP doesn't work
Is there input into the F. JACK?
NO
YES
Is the Q9 base approximately 0.5V?
NO
YES


The band detector doesn't work during tracing
Is it a special type of record listed below?
YES
Recheck it with a regular record
YES
When the sensor sensitivity is changed does the voltage of Q6 pins 8 and 10 (pin 10 as reference) change as shown below? (+5V as reference)
H N L
approximate- ly −0.6 −0.9 −1.3V
NO
Perform error checks on S16, R12, R22 and R41 to 43 and check the patterns around those areas
OK
Perform error checks on R23 and Q11, and check the patterns around those areas
YES
Readjust the band sensor offset VR3
Readjust the band sensor gain VR1, 2
The band detector doesn't work in the UP mode
Is it a special type of record listed below?
YES
Recheck it with a regular record
NO
Is it the same when the sensor sentivity is changed?
NO
Change the sensitivity and recheck
YES
When the sensor sensitivity is changed does the voltage of Q6 pins 8 and 10 (pin 10 as reference) change as shown below? (+5V as reference)
H N L
approximate- ly −0.4V −0.6V −0.8V
NO
Perform error checks on S16, R12 and R41 to R43, then check the patterns in those areas
YES
Readjust the stylus height
NO
Check the stylus height. It should be 6mm above the surface of the record ± 1mm
OK
Readjust the band sensor offset VR3
Readjust the band sonsor gain VR1, 2
Special types of records
• Color records
• Picture records
• Records with extremely narrow bands
• Records with extremely jagged sound grooves
• Extremely dirty or scratched records

16. SUPPLEMENT FOR KC, HEM, HB, S AND S/G TYPES

Model PL-L70/KC, HEM, HB, S and S/G are the same as the PL-L70/KU with the exception of this supplement.

Contrast of Miscellaneous Parts

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561*	*RD¼PS* 5 6 1 *J*
47kΩ	*47 × 10³*	*473*	*RD¼PS* 4 7 3 *J*
0.5Ω	*0R5*		*RN2H* 0 R 5 *K*
1Ω	*010*		*RS1P* 0 1 0 *K*

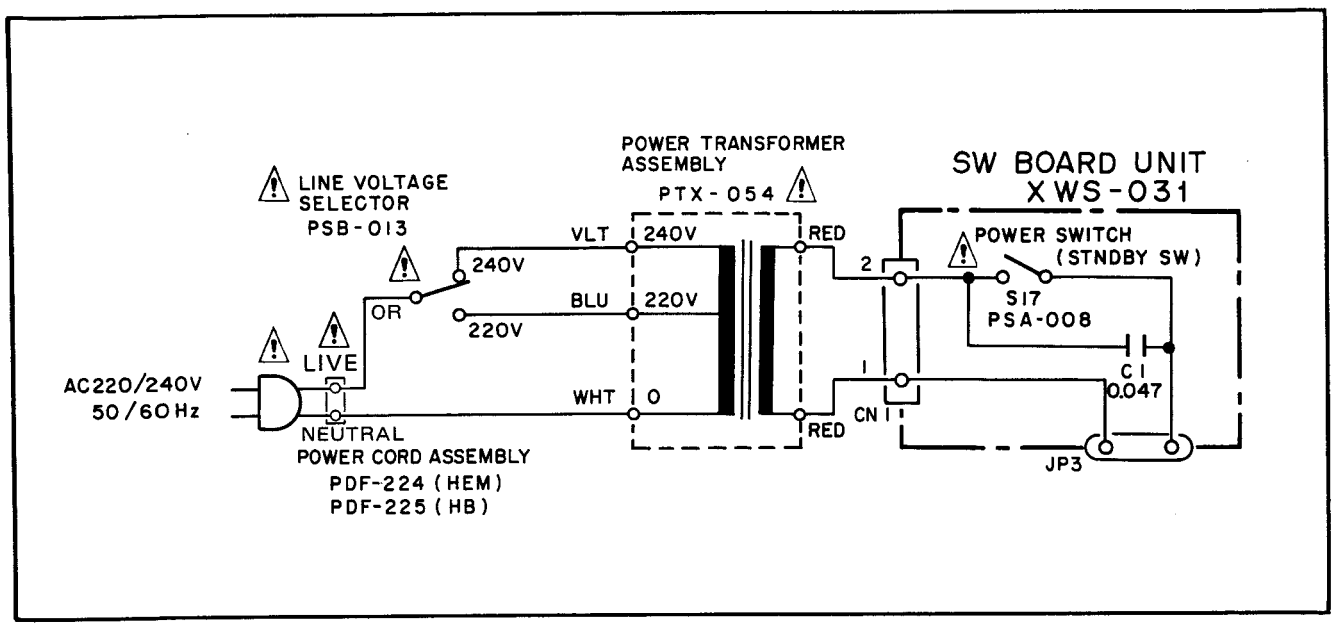
  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN¼SR* 5 6 2 1 *F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	Symbol & Description	Part No.					
		KU type	KC type	HEM type	HB type	S type	S/G type
⚠ ★★	Pannel (P)	PNY-241	PNY-241	PNY-303	PNY-303	PNY-303	PNY-303
⚠ ★★	Power transformer assembly (120V)	PTX-049	PTX-053	...	...	...	...
⚠ ★★	Power transformer assembly (220V/240V)	...	...	PTX-054	PTX-054	...	...
⚠	Power transformer assembly (110V/120V/220V/240V)	...	...	...	...	PTX-055	PTX-055
⚠	Power cord assembly	PDF-221	PDF-221	PDF-224	PDF-225	PDF-220	PDF-220
⚠ ★★	Line voltage selector	...	...	PSB-013	PSB-013	PSB-014	PSB-014
	Operating instructions (English)	PRB-274	PRB-274	...	PRB-274	PRB-274	PRB-274
	Operating instructions (English/German/French/Italian)	...	...	PRE-033	...	...	...
	Packing case	PHH-183	PHH-184	PHH-185	PHH-185	PHH-185	PHH-186
	Pad	...	...	...	...	...	PHC-049

● HEM and HB types



● S and S/G types